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(54) Title: CHARATERIZATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN CODING REGIONS OF HUMAN GENES

(57) Abstract

The invention provides nucleic acid segments of the human genome, particularly nucleic acid segments from the coding region of a gene, including polymorphic sites. Allele–specific primers and probes hybridizing to regions flanking or containing these sites are also provided. The nucleic acids, primers and probes are used in applications such as phenotype correlations, forensics, paternity testing, medicine and genetic analysis.

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CHARACTERIZATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN CODING REGIONS OF HUMAN GENES

RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application Serial No. 60/127,248, filed March 31, 1999, the entire teachings of which are incorporated herein by reference.

GOVERNMENT SUPPORT

The invention was supported, in whole or in part, by grant 5-P50-HG00098-09 SNP from the National Institutes of Health (NCHGR) and grant 1-R01-HL61774-01 from the National Institutes of Health (NHLBI). The Government has certain rights in the invention.

BACKGROUND OF THE INVENTION

A major goal in human genetics is to understand the role of common genetic variants in susceptibility to common diseases (N. Risch and K. Merikangas, *Science, 273*:1516 (1996.); *E. S. Lander, Science, 274*:536 (1996); F.S. Collins, *et al., Science, 278*:1580 (1997)). This requires assembling an extensive catalogue of single-nucleotide polymorphisms (SNPs) and performing systematic association studies for particular diseases.

The human population has relatively limited genetic diversity, reflecting its young age and historically small size (F. J. Ayala *et. al., Proc. Natl. Acad. Sci., 91*:6787 (1994)). Given the restricted nature of the allelic spectrum, some authors have recently suggested that it should eventually be possible to collect all common SNPs in the human population and have hypothesized that such common variants may underlie much of the genetic risk of common disease (N. Risch and K. Merikangas, *Science, 273*:1516 (1996.); *E. S. Lander, Science, 274*:536 (1996); F.S. Collins, *et al., Science, 278*:1580 (1997)). This is in contrast to the situation for rare

Collins, *et al., Science, 278*:1580 (1997)). This is in contrast to the situation for rare genetic diseases, which are primarily caused by a large number of distinct alleles that are recent, rare and highly penetrant Important examples of associations to common (>1%) alleles include the ApoE4 allele in Alzheimer's disease, the Factor V^{Leiden} allele in deep-venous thrombosis, and the CCR5-Δ32 in resistance to HIV infection (A. M. Saunders *et. al., Neurology, 43*:1467 (1993); R. M. Bertina, *Nature, 369*:64 (1994); M. Dean *et. al, Science, 273*:1856 (1996)). The most relevant variants are likely to be those in coding and regulatory regions of genes.

SUMMARY OF THE INVENTION

As described herein, the nature of SNPs in the coding regions of human genes has been explored. SNPs were identified in 106 genes relevant to cardiovascular disease, endocrinology and neuropsychiatry, by screening an average of 114 independent alleles using two independent screening methods. To ensure high accuracy, all reported SNPs were confirmed by DNA sequencing. A total of 545 SNPs were identified, including 395 coding-regions SNPs (cSNPs) divided roughly equally between those causing synonymous and non-synonymous changes. The cSNPs most likely to influence disease, those that alter the amino acid sequence of the encoded protein, show strikingly different properties: they occur at a lower rate and with lower allele frequencies. This likely reflects selection acting against deleterious alleles during human evolution. The lower allele frequency of cSNPs has important implications for the number of chromosomes that must be sampled to construct a comprehensive catalogue of human cSNPs.

The invention relates to a gene which comprises a single nucleotide polymorphism at a specific location. In a particular embodiment the invention relates to the variant allele of a gene having a single nucleotide polymorphism, which variant allele differs from a reference allele by one nucleotide at the site(s) identified in Figures 5A-5QQQQQQQ. Complements of these nucleic acid segments are also included. The segments can be DNA or RNA, and can be double- or single-stranded. Segments can be, for example, 5-10, 5-15, 10-20, 5-25, 10-30, 10-50 or 10-100 bases long. The invention further relates to gene products encoded by genes and oligonucleotides of the invention.

The invention further provides allele-specific oligonucleotides that hybridize to a gene comprising a single nucleotide polymorphism or to the complement of the gene. These oligonucleotides can be probes or primers.

The invention further provides a method of analyzing a nucleic acid from an individual. The method determines which base is present at any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ. Optionally, a set of bases occupying a set of the polymorphic sites shown in Figures 5A-5QQQQQQQ is determined. This type of analysis can be performed on a number of individuals, who are tested for the presence of a disease phenotype. The presence or absence of disease phenotype is then correlated with a base or set of bases present at the polymorphic site or sites in the individuals tested.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a graph showing minor allele frequency by polymorphism type. The percentage of cSNPs having minor allele frequency classified as low (<5%), medium (5-15%) or high (>15%) frequency is displayed for synonymous, non-synonymous and non-coding SNPs.

Figure 2 is a graph showing the distribution of nucleotide diversity. Normalized frequency of variant sites, $\hat{\theta}$, was calculated for the coding region of each gene. The graph shows the percentage of genes having $\hat{\theta}$ in the indicated range.

Figures 3A and 3B are a table showing a summary of polymorphisms in 106 human genes described herein. Column 1 shows the name of the gene as used in Online Mendelian Inheritance in Man. Column 2 shows the number of coding base pairs screened. Column 3 shows the number of synonymous (or silent) polymorphisms identified. Column 4 shows the number of non-synonymous polymorphisms identified. Column 5 shows the number of non-coding base pairs screened. Column 6 shows the number of non-coding polymorphisms, including those in introns and untranslated regions (UTR), identified.

Figure 4 is a table showing polymorphism rates for different classes of sites.

Figures 5A-5QQQQQQQ are a table showing the specific polymorphisms identified in the genes studied as described herein. Column 1 shows the laboratory

designation for the polymorphism. Column 2 shows the name of the gene as used in Online Mendelian Inheritance in Man. Column 3 shows the reference nucleotide which occupies the polymorphic site in the reference allele. Column 4 shows the variant nucleotide which occupies the polymorphic site in the variant allele. Column 5 shows the reference amino acid encoded by the codon which contains the polymorphic site in the reference allele. Column 6 shows the variant or alternate amino acid encoded by the codon which contains the polymorphic site in the variant allele. Column 7 indicates whether the polymorphism is located in the coding or non-coding region of the gene. Column 8 shows the assay number in which the polymorphism was assessed. Columns 9 and 10 show the forward and reverse primers, respectively, which were used to identify the polymorphism. Column 11 shows the sequence of the gene used in the assay, with the polymorphic site indicated by brackets and the primers shown in capital letters. Column 12 shows the total number of nucleotides given in Column 11.

DETAILED DESCRIPTION OF THE INVENTION

There is a rich literature concerning nucleotide variation in model systems, particularly in Drosophila (E. N. Moriyama and J. R. Powell., *Mol. Biol. Evol.*, *13*:261 (1996)), but sequence variation in human genes has been studied only in limited ways. A small number of studies have focused on individual genes (such as beta-globin and lipoprotein lipase) in many individuals, and one study examined 49 genes by comparing two independent sequences deposited in public databases (R. M. Harding *et. al., Am. J. Hum. Genet., 60*:772 (1997); D. A. Nickerson *et. al., Nature Genetics, 19*:233 (1998); W. H. Li and L.A. Sadler, *Genetics 129*:513 (1991)). To perform a more comprehensive survey, as described herein, a collection of 106 genes were selected whose protein products play important roles in the cardiovascular, endocrine and neurological systems (Figures 3A-3B and Figures 5A-5QQQQQQQ). Gene sequences were obtained from the Genbank and TIGR databases. Where multiple sequence depositions were available, a consensus sequence was derived. Determination of coding sequence, untranslated regions and intronic regions was based on annotation in the public database, although internal

checks were performed to ensure accurate determination of start and stop codons, open reading frames and the like.

The genes were chosen because of their relevance to common, clinically significant diseases, such as coronary artery disease, diabetes, and schizophrenia. They encode proteins involved in coagulation, lipid metabolism, energy metabolism, neuroendocrine physiology, neurotransmission and central nervous system development. Variation in these genes was studied in a sample including Caucasians, African-Americans, African Pygmies and Asians, with an average of 114 chromosomes screened for each gene. Of the samples screened, 30 were from Caucasian individuals, 14 from Asian, 10 African American and 7 Africans. The average number of individuals successfully screened for each gene was 57, with the precise number successfully screened varying among genes. Cell lines were obtained from Coriell Cell Repository, and DNA prepared according to standard protocols. In addition, 10 of the Caucasian samples used in this study were obtained as anonymous blood samples from the Physician's Health Study (gift of Charles Hennekens and J. Michael Gaziano). The sample size provides greater than 65% power to detect alleles with frequency of 1%.

Overall, the sample of 114 chromosomes was screened for SNPs in a total of 195.4 kb, consisting of 135.8 kb of coding regions and 59.6 kb from adjacent non-coding region (untranslated region (UTR) and introns). Sequences were amplified by the polymerase chain reaction (PCR) and screened by two independent methods. The first method involved hybridization of labeled PCR products to variant detector arrays (VDAs) (that is, high density DNA probe arrays containing oligonucleotides specific for the sequences under study) (M. Chee *et. al., Science, 274*:610 (1996); D. G. Wang *et. al., Science, 280*:1077 (1998)); variant sequences typically give rise to altered hybridization patterns. These chips contained variant detector arrays (VDA) (M. Chee *et al., Science 274*:610 (1996)).

Using VDAs, candidate SNPs were identified using a combination of three algorithms followed by visual inspection. For each base position and strand queried there are four VDA features: one contains the expected base (the reference sequence) in the central position and the other three features contain central substitution bases (in the background of the reference sequence). The base-calling

algorithm looked for positions at which hybridization to a substitution base gives a stronger signal than the reference base. The second algorithm (mutant fraction) examined the reference base and each one of the substitution bases in turn and calculates the fraction of signal present in the non-reference base. The final algorithm (footprint detection) depends upon a loss of signal at the reference positions surrounding a nucleotide substitution. These algorithms are combined to yield a confidence score of "certain" or "likely" for each candidate polymorphism. Two analysts independently scored the data, and candidate polymorphisms found by either observer were included in subsequent confirmation tests. PCR assays spanning each exon were designed using Primer 3.0 release 0.7. PCR was performed according to standard protocols, and assays destined to be hybridized to the same chip design were pooled together. Chip samples were prepared and hybridized as described in D.G. Wang *et al.* (*Science 280*:1077 (1998)), except that pools consisting of about 100 assays contained 5-6 μg of amplified material. In all, 854 assays (average size of 300 bp, covering 106 genes) were amplified from each individual and were hybridized to 12 distinct chip designs. The probe arrays were designed to query only the coding sequence for some genes, while other genes contained the entire mRNA and/or surrounding intron (Figures 3A-3B). The second method involved subjecting PCR products to Denaturing HPLC (dHPLC) (P. J. Oefner and P. A. Underhill, *Am. J. Hum. Genet., 57*:A266 (1995)) at a critical temperature; heterozygous individuals typically give rise to heteroduplex products with altered denaturation and migration properties.

Sequences were amplified as above except that the final extension in the PCR protocol was followed by denaturation and slow reannealing to allow heteroduplex formation. A total of 6 μl of each individual PCR product was injected into Wave DNA Fragment Analysis System (Transgenomic). A total of 592 of the VDA assays (covering the 89 genes attempted with this method) were successfully screened by DHPLC. Only assays of >160 base pairs were used for DHPLC, because shorter assays performed unreliably for mutation detection. The DHPLC parameters (percentage of acetonitrile, column temperature) used for each fragment were automatically calculated using a novel predictive algorithm, and DHPLC traces were analyzed using the clustering program ASH v2.0. A scoring

algorithm was developed based upon the similarity score by ASHv2.0 and contour of the elution profile.

Because both screening methods can generate to a significant number of false positives, it was important to confirm every reported SNP. Samples implicated by either method as containing a candidate SNP were thus subjected to fluorescent dideoxy sequencing, either to confirm the presence of the SNP (in the case of the chip) or to identify and confirm the presence of the SNP (in the case of DHPLC). Such confirmation proved essential for eliminating false positives.

Candidate SNPs were either validated (if found by VDAs) or identified (if implicated by DHPLC) by DNA sequencing. For this purpose, sequences were amplified with PCR primers tailed with standard M13 sequencing sites (-21 forward and -28 reverse) and conventional dye-primer sequencing was performed on ABI 377 sequencers. For candidate SNPs discovered by VDAs, one individual was chosen (a candidate homozygous variant, when available, or a candidate heterozygote) and sequencing was performed on one strand to confirm by visual inspection the presence of the SNP at the indicated position. For amplicons found to be polymorphic by DHLPC, two individuals were selected representing each distinct elution pattern observed and were sequenced on both strands to discover the variant base or bases. Sequences were base-called by the Phred program, assembled by the Phrap program, and polymorphism candidates were identified by the PolyPhred program (D. A. Nickerson *et. al., NAR, 25*:2745 (1997). All results were visually inspected by at least two observers.

The overall false positive rate for VDAs was 45%. The rate was much lower (about 10%) for certain chip designs, synthesis protocols, and for candidate polymorphisms scored as "certain." The false positive rate among fragments displaying an altered elution pattern by DHPLC was similar (40%). The false positive rates reflect the thresholds employed for declaring a candidate SNP, which were chosen to ensure high sensitivity.

A total of 545 SNPs were identified in the 195 kb surveyed, consisting of 150 non-coding SNPs and 395 cSNPs. Results from these studies are shown in the Figures. The complete data are available on the web site http://www.genome.wi.mit.edu/cvar_snps; access to this website can be gained

using the guestname "snp_pilot" and the password "noynek". In the future, access to this website may be available to the public, and thus, no guestname or password may be needed.

To directly determine the false-negative rate of the screen, conventional DNA sequencing was performed on ten of the genes (THPO, TBAX2R, PTHLH, IGF2, HTR2A, HTR1A, GHR, GABRB1, F10, and CYP11B1) spanning 25.2 kb in twenty individuals. Sequencing was performed on both strands using dye-primer chemistry and sequence traces were interpreted using PolyPhred (D.A. Nickerson *et. al., NAR, 25*:2745 (1997)). VDA analysis identified 85% of variants found by direct sequencing , while DHPLC identified 87% of the variants found by direct sequencing. In regions screened by both VDAs and DHPLC, the combination of the two methods identified 100% of the polymorphisms found by direct sequencing.

Overall, about one-third of individuals were screened with both methods, and one-third were screened with each of the two methods alone. (For some genes, the non-coding regions were screened only by DHPLC.) It is estimated that the false negative rate over the entire study to be about 15% for regions screened by one method, and negligible for sequences screened by both methods. The total number of true polymorphisms not identified is estimated to be less than 10%.

A SNP survey can be characterized in terms of either K, the observed number of variant sites, or p, the observed heterozygosity per bp. Because K increases with the number of chromosomes (n) studied and the total sequence length L, it is preferable to use the normalized number of variant sites

$\hat{\theta} = K/\left(\sum_{i+1}^{n-1} i^{-1}\right) L$ which corrects for sample size. Under the neutral

theory of molecular evolution and infinite sites model, θ and π are both estimators of the population genetic parameter $\theta = 4N\mu$ (Li, *Molecular Evolution, Sinauer Associates* (1997), Canada).

SNPs were found at a similar overall frequency in coding and non-coding regions. SNPs in coding region occurred at a frequency of 1 per 344 bp, corresponding to $\hat{\theta} = 5.47 \times 10^{-4}$ and $\pi = 5.07 \times 10^{-4}$. Interestingly, SNPs were observed in non-coding DNA at a similar frequency of 1 per 397 bp. The

normalized number of variant sites was $\theta = 4.93 \times 10^{-4}$, and the mean heterozygosity (π) = 5.05×10^{-4} (Figure 4). Calculations of π involve allele frequencies. Polymorphisms identified by DHPLC alone were excluded because we did not sequence all of the samples showing a variant DHPLC pattern and thus could not be certain of allele frequency. The estimates of π were thus based on 411 of 545 polymorphisms. Although the VDAs were designed for polymorphism discovery rather than genotyping, the estimated allele frequencies proved to be quite accurate. Specifically, genotyping assays (employing single-base extension assays) for 25 SNPs yielded allele frequencies that differed by an average of only 2% from those estimated on the basis of genotypes inferred from the VDA. For both classes, the similar values for θ and π is consistent with a population evolving according to neutral expectations.

The 395 cSNPs were roughly equally divided between synonymous (203 cSNPs) and non-synonymous (192 cSNPs) changes. Since approximately two-thirds of random mutations would alter an amino acid, the fact that non-synonymous cSNPs comprise slightly less than half of the cSNPs implies strong selection against amino-acid altering changes. To address this issue more directly, the nucleotide diversity was examined at four-fold degenerate sites, two-fold degenerate sites, and non-degenerate sites. Changes at four-fold degenerate sites produce only synonymous changes, while those at non-degenerate sites are always non-synonymous. Nucleotide diversity (θ) was 9.64×10^{-4} at four-fold degenerate sites, 6.85×10^{-4} at two-fold degenerate sites, and 3.70×10^{-4} at non-degenerate sites. Assuming that mutations occur at an equal rate at both classes of sites, non-synonymous variants survive to be detected in such a survey at only 38% of the rate of synonymous changes.

The force of selection is also evident in comparing non-synonymous cSNPs causing a non-conservative amino acid alteration with those causing a conservative amino-acid change. Conservative and non-conservative amino acid substitutions were defined for this analysis according to the BLOSUM62 matrix, used in sequence comparison (S. Henikoff and J. G. Henikoff, *PNAS, 89*:10915 (1992). Conservative changes were those having a positive or neutral sign in the matrix, while non-conservative changes were those having a negative value Non-conservative

cSNPs represent only 36% of the non-synonymous cSNPs, whereas randomly distributed mutations would be expected to produce a higher proportion (52%) of non-conservative changes. The proportion of non-synonymous SNPs expected to cause a non-conservative amino acid substitution was determined based on the actual codon usage in the 106 genes studied, the known frequencies of transitions and transversions, and the definition of non-conservative changes employed in the BLOSUM62 matrix. This implies that non-conservative cSNPs survive to be detected in such a survey at only about half of the rate of conservative, non-synonymous cSNPs.

The various types of SNPs differ not only in the rate of their occurrence, but also in the frequency of their minor alleles. This can be seen in several ways. When SNPs are classified according to whether the frequency of the minor allele was high ($\geq$15%),intermediate (5-15%) or low ($\leq$5%), it is clear that the non-synonymous cSNPs were enriched in low frequency alleles compared to the rest of the collection (Figure 1). The distribution of non-synonymous allele frequencies was significantly different than that of synonymous changes ($p=0.02$, Kolmogorov-Smirnov test). Indeed, more than half (58%) of non-synonymous cSNPs were found at a frequency below 5%, with this effect evident for both conservative and non-conservative substitutions.

The effect of selection can also be inferred by considering the average frequency of the minor allele: it is 8% for non-conservative cSNPs, 11% for conservative but non-synonymous cSNPs, and 14% for both synonymous cSNPs and non-coding SNPs. In addition, the lower allele frequency of non-synonymous cSNPs is reflected in the fact that the heterozygosity π is lower than the normalized rate of variant sites $\hat{\theta}$ for this class of SNPs (Figure 4). This divergence is in the direction predicted by the action of purifying selection, although it falls short of statistical significance. Tajima's D was non-significant. (F. Tajima, *Genetics, 123*:545 (1989).

The distribution of SNPs among the 106 genes was explored, with an eye toward detecting differential effects of selection among genes. The number of cSNPs per gene ranged from 37 for Factor V to 0 for thirteen of the genes, and the normalized rate, $\hat{\theta}$, similarly showed considerable variation (Figure 2). The

observed variation in nucleotide diversity is similar in magnitude to that observed for Drosophila (E. N. Moriyama and J. R. Powell., *Mol. Biol. Evol., 13*:261 (1996)). Variation among genes could be due to many factors (D. J. Begun and C. F. Aquadro, *Nature, 356*:519 (1993); Nachman *et. al., Genetics, 150*:1133 (1998)).

The fact that non-synonymous cSNPs show a somewhat wider variation than synonymous cSNPs (the coefficient of variation is 20% larger for the former class) is consistent with differences in selective constraints among loci, but the difference falls well below statistical significance. A variety of population genetic tests are available for testing selection at individual loci (M. L. Wayne and K. L. Simonson, *Trends and Ecology and Evolution, 13*:236 (1998)).

The age of a SNP allele has important implications for its use in human genetic studies. Recently-occurring SNP alleles are more likely to show extensive linkage disequilibrium (retention of the ancestral haplotype on which they arose) as compared to older SNPs. Such linkage disequilibrium can provide a powerful tool in identifying disease genes (E. S. Lander, N.J. Schork, *Science, 265*:2037 (1994)). Although the precise age of the SNPs could not be assessed from these studies, characterization of which allele preceded human speciation and which arose thereafter was sought. To determine the ancestral human allele, each corresponding gene was sequenced from the common chimpanzee (P. *troglodytes*). Each assay used in the human survey was amplified from a single chimpanzee (DNA gift of Kristin Ardlie) and subjected to dye-primer sequencing on both strands. A single chimpanzee sample will accurately reveal the ancestral allele except in cases where the site has mutated and fixed during the chimpanzee evolution or is polymorphic in the chimpanzee population and happened to be homozygous for the non-ancestral allele. These two cases are quite rare (probably less than 2%) and thus have been neglected for the purpose of estimating overall rates. A human allele was considered to be ancestral if it was present in the homozygous state in the chimpanzee sample. A total of 136 kb of chimpanzee sequence was obtained, revealing an inter-species divergence of 0.6% in the regions studied.

An elegant result in theoretical population genetics predicts that the probability that a neutral allele represents the ancestral state should be equal to its frequency in the population (G. A. Watterson and H. A. Guess, *Theoretical*

Population Biology, 11:141 (1977)). The minor allele should thus represent the ancestral state in a predictable proportion of cases. The ancestral allele and minor allele frequency was determined for 267 of the reported SNPs. For 3 of the 267 SNPs, the chimpanzee was homozygous for a third allele differing from both of the current human alleles. This is consistent with the overall 0.6% nucleotide sequence divergences seen between human and chimpanzee. Among polymorphisms with a minor allele frequency below 10%, the average allele frequency was 3% and the proportion that was ancestral was 7% (11/158) of cases. Among polymorphisms with minor alleles exceeding 10%, the mean frequency was 28% and the proportion that were ancestral was 32% (35/109). These results thus agree remarkably well with the theoretical prediction, providing the first reported test of this prediction in humans. It therefore follows that the minor SNP allele need not be the younger allele; this has implications for linkage disequilibrium mapping.

The distribution of SNPs among Caucasian, African-American, African and Asian samples was also examined. Although the vast majority of SNPs were seen in multiple groups, there was a statistically significant excess of SNPs that were seen in only one of the sub-groups. The probability that a SNP occurring k>1 times in an overall sample of n individuals would be found entirely within a given subset of m individuals is B(n,k)/B(m,k), where B(x,y) is the binomial coefficient x!/(x-y)!y!. In this fashion, the probability that each individual SNP would be confined to a particular ethnic subgroup within the sample was calculated and these probabilities were summed to obtain the number of SNPs expected to be confined to the group within the sample. The fact that a SNP is found only within one group in the sample does not necessarily imply that it is private to that group within the general population, owing to the small sample size, but it can be used as an indication of substructure. The number of SNPs with $k > 1$ confined to the, African-Americans, African Pygmies, Caucasians, and Asians was 17, 17, 12, and 9, as compared to expectations of 3.02, 1.34 , 8.62, and 1.81. Not surprisingly, the greatest excess was seen for SNPs found in the African-American and African samples. The presence of population substructure implies that construction of a comprehensive SNP database should employ a diverse set of DNA samples.

The results of this survey provide a fundamental description of sequence variation in the coding regions of human genes. These data indicate that two copies of a gene chosen from the human population will differ by roughly one base in 2 kb, corresponding to somewhat less than one heterozygous base within the coding region of a typical gene. In general, there are only a handful of such cSNPs per gene that exhibit allele frequencies of at least a few percent. Accounting for both the different rate and frequency of non-synonymous SNPs, only about 40% of these observed changes will alter the encoded amino acid. The action of purifying selection during human evolution is evident from the comparatively lower rate of non-synonymous cSNPs, and especially of those that create a non-conservative change. It is clear that non-synonymous cSNPs not only occur less often, but also have lower minor allele frequencies: 60% of non-synonymous cSNPs, the class likely to have the most dramatic effects on proteins, display a minor allele frequency below 5%.

The relative rarity of cSNPs has important implications for efforts to produce large catalogues of human variants. It has been proposed that most human SNPs could be found by performing shotgun sequencing on a handful of individuals (J. L. Weber and E. W. Myers, *Genome Research, 7*:401 (1997); J. C. Venter *et. al., Science, 280*:1540 (1998)). Although such a project will surely identify many SNPs, results described herein suggest that the small sample size will likely fail to identify the vast majority of cSNPs likely to have the most important biological consequences, owing to their lower average allele frequencies. A comprehensive collection of the common, non-conservative cSNPs may require surveying 50-100 chromosomes. Because coding sequence represents only about 3% of the genome, it may prove inefficient to obtain such deep coverage of cSNPs by shotgun sequencing of genomic DNA. Instead, it may be more efficient to perform shotgun sequencing on cDNA libraries from multiple individuals or to amplify genes from multiple individuals, as done here.

Interestingly, a similar rate of polymorphism in coding and non-coding DNA was found. Furthermore, the observed rate of nucleotide diversity at four-fold degenerate sites was nearly twice that in adjacent non-coding regions, and over twice that at non-degenerate sites (Figure 4). Similar results have been reported for

Drosophila (E. N. Moriyama and J. R. Powell., *Mol. Biol. Evol., 13*:261 (1996)) and for a smaller human data set by Li and Sadler (R. M. Harding *et. al., Am. J. Hum. Genet., 60*:772 (1997); D. A. Nickerson *et. al. , Nature Genetics, 19*:233 (1998); W. H. Li and L.A. Sadler, *Genetics 129*:513 (1991)), who observed over three times the nucleotide diversity at four-fold degenerate sites ($\theta = 11 \times 10^{-4}$), as compared to that in both untranslated regions and non-degenerate sites ($\theta = 3 \times 10^{-4}$). These observations suggest that non-coding DNA adjacent to coding regions may be functionally constrained to a surprising degree.

SNPs can be used to search for genes underlying complex traits in two distinct ways: linkage disequilibrium (LD) studies and association studies (E. S. Lander, N.J. Schork, *Science, 265*:2037 (1994)). Genome-wide LD studies involve using a dense collection of SNPs as markers to search for an ancestral haplotype carrying a disease-susceptibility allele. Such studies cannot be undertaken without the availability of an extremely dense SNP map and their potential for success depends sensitively on many population genetic assumptions. Association studies are more straightforward because they directly test the hypothesis that a specific SNP increases disease risk. They make few assumptions, and require only the availability of a suitable database of appropriate SNPs. In the near term, focusing on cSNPs is likely to be most productive inasmuch as the class is easily recognized (in contrast to regulatory polymorphisms) and is likely to contain a significant proportion of the disease-susceptibility alleles.

The present invention relates to a gene which comprises a single nucleotide polymorphism (SNP) at a specific location. The gene which includes the SNP has at least two alleles, referred to herein as the reference allele and the variant allele. The reference allele (prototypical or wild type allele) has been designated arbitrarily and typically corresponds to the nucleotide sequence of the gene which has been deposited with GenBank or TIGR under a given Accession number. The variant allele differs from the reference allele by one at least one nucleotide at the site(s) identified in Figures 5A-5QQQQQQQ. The present invention also relates to variant alleles of the described genes and to complements of the variant alleles. The invention further relates to portions of the variant alleles and portions of complements of the variant alleles which comprise (encompass) the site of the SNP

and are at least 5 nucleotides in length. Portions can be, for example, 5-10, 5-15, 10-20, 5-25, 10-30, 10-50 or 10-100 bases long. For example, a portion of a variant allele which is 5 nucleotides in length includes the single nucleotide polymorphism (the nucleotide which differs from the reference allele at that site) and four additional nucleotides which flank the site in the variant allele. These nucleotides can be on one or both sides of the polymorphism. Polymorphisms which are the subject of this invention are defined in Figures 5A-5QQQQQQQ with respect to the reference sequence deposited in GenBank under the Accession number indicated. For example, the invention relates to a portion of a gene (e.g., AADC) having a partial nucleotide sequence as shown in Figures 5A-5QQQQQQQ comprising a single nucleotide polymorphism at a specific position. The reference nucleotide for AADC is shown in column 3 and the variant nucleotide is shown in column 4 of Figures 5A-5QQQQQQQ. The nucleotide sequences of the invention can be double- or single-stranded.

The invention further provides allele-specific oligonucleotides that hybridize to a gene comprising a single nucleotide polymorphism or to the complement of the gene. These oligonucleotides can be probes or primers.

The invention further provides a method of analyzing a nucleic acid from an individual. The method determines which base is present at any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ. Optionally, a set of bases occupying a set of the polymorphic sites shown in Figures 5A-5QQQQQQQ is determined. This type of analysis can be performed on a number of individuals, who are tested for the presence of a disease phenotype. The presence or absence of disease phenotype is then correlated with a base or set of bases present at the polymorphic site or sites in the individuals tested.

An oligonucleotide of this invention can be DNA or RNA, and single- or double-stranded. Oligonucleotides can be naturally occurring or synthetic, but are typically prepared by synthetic means. Preferred oligonucleotides of the invention include segments of DNA, or their complements, which include any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ. The segments can be between 5 and 250 bases, and, in specific embodiments, are between 5-10, 5-20, 10-20, 10-50, 20-50 or 10-100 bases. The polymorphic site can occur within any

position of the segment. The segments can be from any of the allelic forms of DNA shown in Figures 5A-5QQQQQQ.

As used herein, the terms "nucleotide" and "nucleic acid" are intended to be equivalent. The terms "nucleotide sequence", "nucleic acid sequence" "nucleic acid molecule" and "segment" are intended to be equivalent.

Hybridization probes are oligonucleotides which bind in a base-specific manner to a complementary strand of nucleic acid. Such probes include peptide nucleic acids, as described in Nielsen *et al.*, *Science* 254, 1497-1500 (1991). Probes can be any length suitable for specific hybridization to the target nucleic acid sequence. The most appropriate length of the probe may vary depending upon the hybridization method in which it is being used; for example, particular lengths may be more appropriate for use in microfabricated arrays, while other lengths may be more suitable for use in classical hybridization methods. Suitable probes and primers can range from about 5 nucleotides to about 30 nucleotides in length. For example, probes and primers can be 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 25, 26, 28 or 30 nucleotides in length. The probe or primer preferably contains at least one polymorphic site occupied by any of the possible variant nucleotides. The nucleotide sequence can correspond to the coding sequence of the allele or to the complement of the coding sequence of the allele.

As used herein, the term "primer" refers to a single-stranded oligonucleotide which acts as a point of initiation of template-directed DNA synthesis under appropriate conditions (*e.g.*, in the presence of four different nucleoside triphosphates and an agent for polymerization, such as, DNA or RNA polymerase or reverse transcriptase) in an appropriate buffer and at a suitable temperature. The appropriate length of a primer depends on the intended use of the primer, but typically ranges from 15 to 30 nucleotides. Short primer molecules generally require cooler temperatures to form sufficiently stable hybrid complexes with the template. A primer need not reflect the exact sequence of the template, but must be sufficiently complementary to hybridize with a template. The term primer site refers to the area of the target DNA to which a primer hybridizes. The term primer pair refers to a set of primers including a 5' (upstream) primer that hybridizes with the 5'

end of the DNA sequence to be amplified and a 3' (downstream) primer that hybridizes with the complement of the 3' end of the sequence to be amplified.

As used herein, linkage describes the tendency of genes, alleles, loci or genetic markers to be inherited together as a result of their location on the same chromosome. It can be measured by percent recombination between the two genes, alleles, loci or genetic markers.

As used herein, polymorphism refers to the occurrence of two or more genetically determined alternative sequences or alleles in a population. A polymorphic marker or site is the locus at which divergence occurs. Preferred markers have at least two alleles, each occurring at frequency of greater than 1%, and more preferably greater than 10% or 20% of a selected population. A polymorphic locus may be as small as one base pair. Polymorphic markers include restriction fragment length polymorphisms, variable number of tandem repeats (VNTR's), hypervariable regions, minisatellites, dinucleotide repeats, trinucleotide repeats, tetranucleotide repeats, simple sequence repeats, and insertion elements such as Alu. The first identified allelic form is arbitrarily designated as the reference form and other allelic forms are designated as alternative or variant alleles. The allelic form occurring most frequently in a selected population is sometimes referred to as the wildtype form. Diploid organisms may be homozygous or heterozygous for allelic forms. A diallelic or biallelic polymorphism has two forms. A triallelic polymorphism has three forms.

By altering amino acid sequence, SNPs may alter the function of the encoded proteins. The discovery of the SNP facilitates biochemical analysis of the variants and the development of assays to characterize the variants and to screen for pharmaceutical that would interact directly with on or another form of the protein. SNPs (including silent SNPs) may also alter the regulation of the gene at the transcriptional or post-transcriptional level. SNPs (including silent SNPs) also enable the development of specific DNA, RNA, or protein-based diagnostics that detect the presence or absence of the polymorphism in particular conditions.

A single nucleotide polymorphism occurs at a polymorphic site occupied by a single nucleotide, which is the site of variation between allelic sequences. The site

is usually preceded by and followed by highly conserved sequences of the allele (e.g., sequences that vary in less than 1/100 or 1/1000 members of the populations).

A single nucleotide polymorphism usually arises due to substitution of one nucleotide for another at the polymorphic site. A transition is the replacement of one purine by another purine or one pyrimidine by another pyrimidine. A transversion is the replacement of a purine by a pyrimidine or vice versa. Single nucleotide polymorphisms can also arise from a deletion of a nucleotide or an insertion of a nucleotide relative to a reference allele. Typically the polymorphic site is occupied by a base other than the reference base. For example, where the reference allele contains the base "T" at the polymorphic site, the altered allele can contain a "C", "G" or "A" at the polymorphic site.

Hybridizations are usually performed under stringent conditions, for example, at a salt concentration of no more than 1 M and a temperature of at least 25°C. For example, conditions of 5X SSPE (750 mM NaCl, 50 mM NaPhosphate, 5 mM EDTA, pH 7.4) and a temperature of 25-30°C, or equivalent conditions, are suitable for allele-specific probe hybridizations. Equivalent conditions can be determined by varying one or more of the parameters given as an example, as known in the art, while maintaining a similar degree of identity or similarity between the target nucleotide sequence and the primer or probe used.

The term "isolated" is used herein to indicate that the material in question exists in a physical milieu distinct from that in which it occurs in nature. For example, an isolated nucleic acid of the invention may be substantially isolated with respect to the complex cellular milieu in which it naturally occurs. In some instances, the isolated material will form part of a composition (for example, a crude extract containing other substances), buffer system or reagent mix. In other circumstance, the material may be purified to essential homogeneity, for example as determined by PAGE or column chromatography such as HPLC. Preferably, an isolated nucleic acid comprises at least about 50, 80 or 90 percent (on a molar basis) of all macromolecular species present.

I. Analysis of Polymorphisms

A. Preparation of Samples

Polymorphisms are detected in a target nucleic acid from an individual being analyzed. For assay of genomic DNA, virtually any biological sample (other than pure red blood cells) is suitable. For example, convenient tissue samples include whole blood, semen, saliva, tears, urine, fecal material, sweat, buccal, skin and hair. For assay of cDNA or mRNA, the tissue sample must be obtained from an organ in which the target nucleic acid is expressed. For example, if the target nucleic acid is a cytochrome P450, the liver is a suitable source.

Many of the methods described below require amplification of DNA from target samples. This can be accomplished by e.g., PCR. *See generally PCR Technology: Principles and Applications for DNA Amplification* (ed. H.A. Erlich, Freeman Press, NY, NY, 1992); *PCR Protocols: A Guide to Methods and Applications* (eds. Innis, *et al.*, Academic Press, San Diego, CA, 1990); Mattila *et al.*, *Nucleic Acids Res.* 19, 4967 (1991); Eckert *et al.*, *PCR Methods and Applications* 1, 17 (1991); *PCR* (eds. McPherson *et al.*, IRL Press, Oxford); and U.S. Patent 4,683,202.

Other suitable amplification methods include the ligase chain reaction (LCR) (see Wu and Wallace, *Genomics* 4, 560 (1989), Landegren *et al.*, *Science* 241, 1077 (1988), transcription amplification (Kwoh *et al.*, *Proc. Natl. Acad. Sci. USA* 86, 1173 (1989)), and self-sustained sequence replication (Guatelli *et al.*, *Proc. Nat. Acad. Sci. USA,* 87, 1874 (1990)) and nucleic acid based sequence amplification (NASBA). The latter two amplification methods involve isothermal reactions based on isothermal transcription, which produce both single stranded RNA (ssRNA) and double stranded DNA (dsDNA) as the amplification products in a ratio of about 30 or 100 to 1, respectively.

B. Detection of Polymorphisms in Target DNA

There are two distinct types of analysis of target DNA for detecting polymorphisms. The first type of analysis, sometimes referred to as de novo characterization, is carried out to identify polymorphic sites not previously characterized (i.e., to identify new polymorphisms). This analysis compares target

sequences in different individuals to identify points of variation, i.e., polymorphic sites. By analyzing groups of individuals representing the greatest ethnic diversity among humans and greatest breed and species variety in plants and animals, patterns characteristic of the most common alleles/haplotypes of the locus can be identified, and the frequencies of such alleles/haplotypes in the population can be determined. Additional allelic frequencies can be determined for subpopulations characterized by criteria such as geography, race, or gender. The de novo identification of polymorphisms of the invention is described in the Examples section. The second type of analysis determines which form(s) of a characterized (known) polymorphism are present in individuals under test. There are a variety of suitable procedures, which are discussed in turn.

1. Allele-Specific Probes

The design and use of allele-specific probes for analyzing polymorphisms is described by e.g., Saiki *et al.*, *Nature* 324, 163-166 (1986); Dattagupta, EP 235,726, Saiki, WO 89/11548. Allele-specific probes can be designed that hybridize to a segment of target DNA from one individual but do not hybridize to the corresponding segment from another individual due to the presence of different polymorphic forms in the respective segments from the two individuals. Hybridization conditions should be sufficiently stringent that there is a significant difference in hybridization intensity between alleles, and preferably an essentially binary response, whereby a probe hybridizes to only one of the alleles. Some probes are designed to hybridize to a segment of target DNA such that the polymorphic site aligns with a central position (e.g., in a 15-mer at the 7 position; in a 16-mer, at either the 8 or 9 position) of the probe. This design of probe achieves good discrimination in hybridization between different allelic forms.

Allele-specific probes are often used in pairs, one member of a pair showing a perfect match to a reference form of a target sequence and the other member showing a perfect match to a variant form. Several pairs of probes can then be immobilized on the same support for simultaneous analysis of multiple polymorphisms within the same target sequence.

2. Tiling Arrays

The polymorphisms can also be identified by hybridization to nucleic acid arrays, some examples of which are described in WO 95/11995. One form of such arrays is described in the Examples section in connection with de novo identification of polymorphisms. The same array or a different array can be used for analysis of characterized polymorphisms. WO 95/11995 also describes subarrays that are optimized for detection of a variant form of a precharacterized polymorphism. Such a subarray contains probes designed to be complementary to a second reference sequence, which is an allelic variant of the first reference sequence. The second group of probes is designed by the same principles as described in the Examples, except that the probes exhibit complementarity to the second reference sequence. The inclusion of a second group (or further groups) can be particularly useful for analyzing short subsequences of the primary reference sequence in which multiple mutations are expected to occur within a short distance commensurate with the length of the probes (e.g., two or more mutations within 9 to 21 bases).

3. Allele-Specific Primers

An allele-specific primer hybridizes to a site on target DNA overlapping a polymorphism and only primes amplification of an allelic form to which the primer exhibits perfect complementarity. See Gibbs, *Nucleic Acid Res.* 17, 2427-2448 (1989). This primer is used in conjunction with a second primer which hybridizes at a distal site. Amplification proceeds from the two primers, resulting in a detectable product which indicates the particular allelic form is present. A control is usually performed with a second pair of primers, one of which shows a single base mismatch at the polymorphic site and the other of which exhibits perfect complementarity to a distal site. The single-base mismatch prevents amplification and no detectable product is formed. The method works best when the mismatch is included in the 3'-most position of the oligonucleotide aligned with the polymorphism because this position is most destabilizing to elongation from the primer (see, e.g., WO 93/22456).

4. Direct-Sequencing

The direct analysis of the sequence of polymorphisms of the present invention can be accomplished using either the dideoxy chain termination method or the Maxam Gilbert method (see Sambrook *et al.*, *Molecular Cloning, A Laboratory Manual* (2nd Ed., CSHP, New York 1989); Zyskind *et al.*, *Recombinant DNA Laboratory Manual*, (Acad. Press, 1988)).

5. Denaturing Gradient Gel Electrophoresis

Amplification products generated using the polymerase chain reaction can be analyzed by the use of denaturing gradient gel electrophoresis. Different alleles can be identified based on the different sequence-dependent melting properties and electrophoretic migration of DNA in solution. Erlich, ed., *PCR Technology, Principles and Applications for DNA Amplification*, (W.H. Freeman and Co, New York, 1992), Chapter 7.

6. Single-Strand Conformation Polymorphism Analysis

Alleles of target sequences can be differentiated using single-strand conformation polymorphism analysis, which identifies base differences by alteration in electrophoretic migration of single stranded PCR products, as described in Orita *et al.*, *Proc. Nat. Acad. Sci.* 86, 2766-2770 (1989). Amplified PCR products can be generated as described above, and heated or otherwise denatured, to form single stranded amplification products. Single-stranded nucleic acids may refold or form secondary structures which are partially dependent on the base sequence. The different electrophoretic mobilities of single-stranded amplification products can be related to base-sequence differences between alleles of target sequences.

II. Methods of Use

After determining polymorphic form(s) present in an individual at one or more polymorphic sites, this information can be used in a number of methods.

A. Forensics

Determination of which polymorphic forms occupy a set of polymorphic sites in an individual identifies a set of polymorphic forms that distinguishes the individual. *See generally* National Research Council, *The Evaluation of Forensic DNA Evidence* (Eds. Pollard *et al.*, National Academy Press, DC, 1996). The more sites that are analyzed, the lower the probability that the set of polymorphic forms in one individual is the same as that in an unrelated individual. Preferably, if multiple sites are analyzed, the sites are unlinked. Thus, polymorphisms of the invention are often used in conjunction with polymorphisms in distal genes. Preferred polymorphisms for use in forensics are biallelic because the population frequencies of two polymorphic forms can usually be determined with greater accuracy than those of multiple polymorphic forms at multi-allelic loci.

The capacity to identify a distinguishing or unique set of forensic markers in an individual is useful for forensic analysis. For example, one can determine whether a blood sample from a suspect matches a blood or other tissue sample from a crime scene by determining whether the set of polymorphic forms occupying selected polymorphic sites is the same in the suspect and the sample. If the set of polymorphic markers does not match between a suspect and a sample, it can be concluded (barring experimental error) that the suspect was not the source of the sample. If the set of markers does match, one can conclude that the DNA from the suspect is consistent with that found at the crime scene. If frequencies of the polymorphic forms at the loci tested have been determined (e.g., by analysis of a suitable population of individuals), one can perform a statistical analysis to determine the probability that a match of suspect and crime scene sample would occur by chance.

p(ID) is the probability that two random individuals have the same polymorphic or allelic form at a given polymorphic site. In biallelic loci, four genotypes are possible: AA, AB, BA, and BB. If alleles A and B occur in a haploid genome of the organism with frequencies x and y, the probability of each genotype in a diploid organism is (see WO 95/12607):

Homozygote: $p(AA)= x^2$
Homozygote: $p(BB)= y^2 = (1-x)^2$

Single Heterozygote: p(AB)= p(BA)= xy = x(1-x)
Both Heterozygotes: p(AB+BA)= 2xy = 2x(1-x)

The probability of identity at one locus (i.e, the probability that two individuals, picked at random from a population will have identical polymorphic forms at a given locus) is given by the equation:

$p(ID) = (x^2)^2 + (2xy)^2 + (y^2)^2$.

These calculations can be extended for any number of polymorphic forms at a given locus. For example, the probability of identity p(ID) for a 3-allele system where the alleles have the frequencies in the population of x, y and z, respectively, is equal to the sum of the squares of the genotype frequencies:

$p(ID) = x^4 + (2xy)^2 + (2yz)^2 + (2xz)^2 + z^4 + y^4$

In a locus of n alleles, the appropriate binomial expansion is used to calculate p(ID) and p(exc).

The cumulative probability of identity (cum p(ID)) for each of multiple unlinked loci is determined by multiplying the probabilities provided by each locus.

cum p(ID) = p(ID1)p(ID2)p(ID3).... p(IDn)

The cumulative probability of non-identity for n loci (i.e. the probability that two random individuals will be different at 1 or more loci) is given by the equation:

cum p(nonID) = 1-cum p(ID).

If several polymorphic loci are tested, the cumulative probability of non-identity for random individuals becomes very high (e.g., one billion to one). Such probabilities can be taken into account together with other evidence in determining the guilt or innocence of the suspect.

B. Paternity Testing

The object of paternity testing is usually to determine whether a male is the father of a child. In most cases, the mother of the child is known and thus, the mother's contribution to the child's genotype can be traced. Paternity testing investigates whether the part of the child's genotype not attributable to the mother is consistent with that of the putative father. Paternity testing can be performed by analyzing sets of polymorphisms in the putative father and the child.

If the set of polymorphisms in the child attributable to the father does not match the set of polymorphisms of the putative father, it can be concluded, barring experimental error, that the putative father is not the real father. If the set of polymorphisms in the child attributable to the father does match the set of polymorphisms of the putative father, a statistical calculation can be performed to determine the probability of coincidental match.

The probability of parentage exclusion (representing the probability that a random male will have a polymorphic form at a given polymorphic site that makes him incompatible as the father) is given by the equation (see WO 95/12607):

$$p(exc) = xy(1-xy)$$

where x and y are the population frequencies of alleles A and B of a biallelic polymorphic site.

(At a triallelic site $p(exc) = xy(1-xy) + yz(1- yz) + xz(1-xz)+ 3xyz(1-xyz))$), where x, y and z and the respective population frequencies of alleles A, B and C).

The probability of non-exclusion is

$$p(non\text{-}exc) = 1-p(exc)$$

The cumulative probability of non-exclusion (representing the value obtained when n loci are used) is thus:

$$cum\ p(non\text{-}exc) = p(non\text{-}exc1)p(non\text{-}exc2)p(non\text{-}exc3)\ldots. p(non\text{-}excn)$$

The cumulative probability of exclusion for n loci (representing the probability that a random male will be excluded)

$$cum\ p(exc) = 1 - cum\ p(non\text{-}exc).$$

If several polymorphic loci are included in the analysis, the cumulative probability of exclusion of a random male is very high. This probability can be taken into account in assessing the liability of a putative father whose polymorphic marker set matches the child's polymorphic marker set attributable to his/her father.

C. Correlation of Polymorphisms with Phenotypic Traits

The polymorphisms of the invention may contribute to the phenotype of an organism in different ways. Some polymorphisms occur within a protein coding sequence and contribute to phenotype by affecting protein structure. The effect may be neutral, beneficial or detrimental, or both beneficial and detrimental, depending

on the circumstances. For example, a heterozygous sickle cell mutation confers resistance to malaria, but a homozygous sickle cell mutation is usually lethal. Other polymorphisms occur in noncoding regions but may exert phenotypic effects indirectly via influence on replication, transcription, and translation. A single polymorphism may affect more than one phenotypic trait. Likewise, a single phenotypic trait may be affected by polymorphisms in different genes. Further, some polymorphisms predispose an individual to a distinct mutation that is causally related to a certain phenotype.

Phenotypic traits include diseases that have known but hitherto unmapped genetic components. Phenotypic traits also include symptoms of, or susceptibility to, multifactorial diseases of which a component is or may be genetic, such as autoimmune diseases, inflammation, cancer, diseases of the nervous system, and infection by pathogenic microorganisms. Some examples of diseases which can be treated or diagnosed as described herein include, but are not limited to, bradyarrhythmias, tachyarrhythmias, heart failure, such as congestive heart failure, congenital heart disease, rheumatic fever, valvular heart disease, cardiomyopathies, myocarditides, pericardial diseases, cardiac tumors, cardiac manifestations of systemic diseases, and traumatic cardiac injury. Other disorders include atherosclerosis, acute myocardial infarction, ischemic heart disease, hypertensive vascular disease, disorders of the aorta, vascular diseases of the extremities, vessel wall disorders, such as various forms of thrombocytopenia, von Willebrand's disease and drug-induced platelet dysfunction, and homeostatic disorders relating to vessel disease and associated bleeding. Also suitable are thrombotic thrombocytopenic purpura, hemolytic-uremic syndrome, Henoch-Schönlein purpura, capillary fragility, vascular purpura, metabolic and inflammatory disorders, such as those induced by rickettsiae and certain drugs, such as sulfonamides, aortic aneurysm, aortic dissection, aortic occlusion, aortitis, atherosclerosis, coronary artery disease, angina, myocardial infarction, thrombosis, hemostatic and coagulation disorders, hypertension and hypotension. Other disorders include transplant accelerated vascular restenosis following balloon angioplasty, Raynaud's disease and acrocyanosis.

Additional disorders include, but are not limited to, disorders of neurodegeneration characterized by astrocyte hypertrophy including gliosis, Pick's disease, aceroplasminemia, portal-systemic encephalopathy, frontal lobe dementia and inherited and acquired ataxias, neurodegenerative diseases of other etiology including progressive supranuclear palsy, primary progressive aphasia, cortical basal degeneration, Alzheimer's disease, Huntington's disease, and Parkinson's disease, retinitis pigmentosa and amylotrophic lateral sclerosis. Other disorders include epilepsy, stroke, defects of neural migration and differentiation, including Miller-Dieker lissencephaly syndrome, and cancer of the brain including astrocytomas and gliomas, as well as psychological disorders such as schizophrenia.

Phenotypic traits also include characteristics such as longevity, appearance (e.g., baldness, obesity), strength, speed, endurance, fertility, and susceptibility or receptivity to particular drugs or therapeutic treatments.

The correlation of one or more polymorphisms with phenotypic traits can be facilitated by knowledge of the gene product of the wild type (reference) gene. The genes in which cSNPs of the present invention have been identified are genes which have been previously sequenced and characterized in one of their allelic forms.

Correlation is performed for a population of individuals who have been tested for the presence or absence of a phenotypic trait of interest and for polymorphic markers sets. To perform such analysis, the presence or absence of a set of polymorphisms (i.e. a polymorphic set) is determined for a set of the individuals, some of whom exhibit a particular trait, and some of which exhibit lack of the trait. The alleles of each polymorphism of the set are then reviewed to determine whether the presence or absence of a particular allele is associated with the trait of interest. Correlation can be performed by standard statistical methods such as a κ-squared test and statistically significant correlations between polymorphic form(s) and phenotypic characteristics are noted. For example, it might be found that the presence of allele A1 at polymorphism A correlates with heart disease. As a further example, it might be found that the combined presence of allele A1 at polymorphism A and allele B1 at polymorphism B correlates with increased milk production of a farm animal.

Such correlations can be exploited in several ways. In the case of a strong correlation between a set of one or more polymorphic forms and a disease for which treatment is available, detection of the polymorphic form set in a human or animal patient may justify immediate administration of treatment, or at least the institution of regular monitoring of the patient. Detection of a polymorphic form correlated with serious disease in a couple contemplating a family may also be valuable to the couple in their reproductive decisions. For example, the female partner might elect to undergo in vitro fertilization to avoid the possibility of transmitting such a polymorphism from her husband to her offspring. In the case of a weaker, but still statistically significant correlation between a polymorphic set and human disease, immediate therapeutic intervention or monitoring may not be justified. Nevertheless, the patient can be motivated to begin simple life-style changes (e.g., diet, exercise) that can be accomplished at little cost to the patient but confer potential benefits in reducing the risk of conditions to which the patient may have increased susceptibility by virtue of variant alleles. Identification of a polymorphic set in a patient correlated with enhanced receptiveness to one of several treatment regimes for a disease indicates that this treatment regime should be followed.

For animals and plants, correlations between characteristics and phenotype are useful for breeding for desired characteristics. For example, Beitz *et al.*, US 5,292,639 discuss use of bovine mitochondrial polymorphisms in a breeding program to improve milk production in cows. To evaluate the effect of mtDNA D-loop sequence polymorphism on milk production, each cow was assigned a value of 1 if variant or 0 if wildtype with respect to a prototypical mitochondrial DNA sequence at each of 17 locations considered. Each production trait was analyzed individually with the following animal model:

$$Y_{ijkpn} = \mu + YS_i + P_j + X_k + \beta_1 + \ldots \beta_{17} + PE_n + a_n + e_p$$

where Y_{ijknp} is the milk, fat, fat percentage, SNF, SNF percentage, energy concentration, or lactation energy record; μ is an overall mean; YS_i is the effect common to all cows calving in year-season; X_k is the effect common to cows in either the high or average selection line; β_1 to β_{17} are the binomial regressions of production record on mtDNA D-loop sequence polymorphisms; PE_n is permanent environmental effect common to all records of cow n; a_n is effect of animal n and is

composed of the additive genetic contribution of sire and dam breeding values and a Mendelian sampling effect; and e_p is a random residual. It was found that eleven of seventeen polymorphisms tested influenced at least one production trait. Bovines having the best polymorphic forms for milk production at these eleven loci are used as parents for breeding the next generation of the herd.

D. Genetic Mapping of Phenotypic Traits

The previous section concerns identifying correlations between phenotypic traits and polymorphisms that directly or indirectly contribute to those traits. The present section describes identification of a physical linkage between a genetic locus associated with a trait of interest and polymorphic markers that are not associated with the trait, but are in physical proximity with the genetic locus responsible for the trait and co-segregate with it. Such analysis is useful for mapping a genetic locus associated with a phenotypic trait to a chromosomal position, and thereby cloning gene(s) responsible for the trait. *See* Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 83, 7353-7357 (1986); Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 84, 2363-2367 (1987); Donis-Keller *et al.*, *Cell* 51, 319-337 (1987); Lander *et al.*, *Genetics* 121, 185-199 (1989)). Genes localized by linkage can be cloned by a process known as directional cloning. *See* Wainwright, *Med. J. Australia* 159, 170-174 (1993); Collins, *Nature Genetics* 1, 3-6 (1992).

Linkage studies are typically performed on members of a family. Available members of the family are characterized for the presence or absence of a phenotypic trait and for a set of polymorphic markers. The distribution of polymorphic markers in an informative meiosis is then analyzed to determine which polymorphic markers co-segregate with a phenotypic trait. *See, e.g.*, Kerem *et al.*, *Science* 245, 1073-1080 (1989); Monaco *et al.*, *Nature* 316, 842 (1985); Yamoka *et al.*, *Neurology* 40, 222-226 (1990); Rossiter *et al.*, *FASEB Journal* 5, 21-27 (1991).

Linkage is analyzed by calculation of LOD (log of the odds) values. A lod value is the relative likelihood of obtaining observed segregation data for a marker and a genetic locus when the two are located at a recombination fraction θ, versus the situation in which the two are not linked, and thus segregating independently (Thompson & Thompson, *Genetics in Medicine* (5th ed, W.B. Saunders Company,

Philadelphia, 1991); Strachan, "Mapping the human genome" in *The Human Genome* (BIOS Scientific Publishers Ltd, Oxford), Chapter 4). A series of likelihood ratios are calculated at various recombination fractions (θ), ranging from $\theta = 0.0$ (coincident loci) to $\theta = 0.50$ (unlinked). Thus, the likelihood at a given value of θ is: probability of data if loci linked at θ to probability of data if loci unlinked. The computed likelihoods are usually expressed as the $\log_{10}$ of this ratio (i.e., a lod score). For example, a lod score of 3 indicates 1000:1 odds against an apparent observed linkage being a coincidence. The use of logarithms allows data collected from different families to be combined by simple addition. Computer programs are available for the calculation of lod scores for differing values of θ (e.g., LIPED, MLINK (Lathrop, *Proc. Nat. Acad. Sci. (USA)* 81, 3443-3446 (1984)). For any particular lod score, a recombination fraction may be determined from mathematical tables. *See* Smith *et al.*, *Mathematical tables for research workers in human genetics* (Churchill, London, 1961); Smith, *Ann. Hum. Genet.* 32, 127-150 (1968). The value of θ at which the lod score is the highest is considered to be the best estimate of the recombination fraction.

Positive lod score values suggest that the two loci are linked, whereas negative values suggest that linkage is less likely (at that value of θ) than the possibility that the two loci are unlinked. By convention, a combined lod score of +3 or greater (equivalent to greater than 1000:1 odds in favor of linkage) is considered definitive evidence that two loci are linked. Similarly, by convention, a negative lod score of -2 or less is taken as definitive evidence against linkage of the two loci being compared. Negative linkage data are useful in excluding a chromosome or a segment thereof from consideration. The search focuses on the remaining non-excluded chromosomal locations.

III. Modified Polypeptides and Gene Sequences

The invention further provides variant forms of nucleic acids and corresponding proteins. The nucleic acids comprise one of the sequences described in Figures 5A-5QQQQQQQ, column 11, in which the polymorphic position is occupied by one of the alternative bases for that position. Some nucleic acids encode full-length variant forms of proteins. Similarly, variant proteins have the

prototypical amino acid sequences encoded by nucleic acid sequences shown in Figures 5A-5QQQQQQ, column 11, (read so as to be in-frame with the full-length coding sequence of which it is a component) except at an amino acid encoded by a codon including one of the polymorphic positions shown in Figures 5A-5QQQQQQ. That position is occupied by the amino acid coded by the corresponding codon in any of the alternative forms shown in Figures 5A-5QQQQQQ.

Variant genes can be expressed in an expression vector in which a variant gene is operably linked to a native or other promoter. Usually, the promoter is a eukaryotic promoter for expression in a mammalian cell. The transcription regulation sequences typically include a heterologous promoter and optionally an enhancer which is recognized by the host. The selection of an appropriate promoter, for example trp, lac, phage promoters, glycolytic enzyme promoters and tRNA promoters, depends on the host selected. Commercially available expression vectors can be used. Vectors can include host-recognized replication systems, amplifiable genes, selectable markers, host sequences useful for insertion into the host genome, and the like.

The means of introducing the expression construct into a host cell varies depending upon the particular construction and the target host. Suitable means include fusion, conjugation, transfection, transduction, electroporation or injection, as described in Sambrook, *supra*. A wide variety of host cells can be employed for expression of the variant gene, both prokaryotic and eukaryotic. Suitable host cells include bacteria such as *E. coli*, yeast, filamentous fungi, insect cells, mammalian cells, typically immortalized, *e.g.*, mouse, CHO, human and monkey cell lines and derivatives thereof. Preferred host cells are able to process the variant gene product to produce an appropriate mature polypeptide. Processing includes glycosylation, ubiquitination, disulfide bond formation, general post-translational modification, and the like.

The protein may be isolated by conventional means of protein biochemistry and purification to obtain a substantially pure product, *i.e.*, 80, 95 or 99% free of cell component contaminants, as described in Jacoby, *Methods in Enzymology* Volume 104, Academic Press, New York (1984); Scopes, *Protein Purification. Principles*

and Practice, 2nd Edition, Springer-Verlag, New York (1987); and Deutscher (ed), *Guide to Protein Purification, Methods in Enzymology*, Vol. 182 (1990). If the protein is secreted, it can be isolated from the supernatant in which the host cell is grown. If not secreted, the protein can be isolated from a lysate of the host cells.

The invention further provides transgenic nonhuman animals capable of expressing an exogenous variant gene and/or having one or both alleles of an endogenous variant gene inactivated. Expression of an exogenous variant gene is usually achieved by operably linking the gene to a promoter and optionally an enhancer, and microinjecting the construct into a zygote. *See* Hogan *et al.*, "Manipulating the Mouse Embryo, A Laboratory Manual," Cold Spring Harbor Laboratory. Inactivation of endogenous variant genes can be achieved by forming a transgene in which a cloned variant gene is inactivated by insertion of a positive selection marker. *See* Capecchi, *Science* 244, 1288-1292 (1989). The transgene is then introduced into an embryonic stem cell, where it undergoes homologous recombination with an endogenous variant gene. Mice and other rodents are preferred animals. Such animals provide useful drug screening systems.

In addition to substantially full-length polypeptides expressed by variant genes, the present invention includes biologically active fragments of the polypeptides, or analogs thereof, including organic molecules which simulate the interactions of the peptides. Biologically active fragments include any portion of the full-length polypeptide which confers a biological function on the variant gene product, including ligand binding, and antibody binding. Ligand binding includes binding by nucleic acids, proteins or polypeptides, small biologically active molecules, or large cellular structures.

Polyclonal and/or monoclonal antibodies that specifically bind to variant gene products but not to corresponding prototypical gene products are also provided. Antibodies can be made by injecting mice or other animals with the variant gene product or synthetic peptide fragments thereof. Monoclonal antibodies are screened as are described, for example, in Harlow & Lane, *Antibodies, A Laboratory Manual*, Cold Spring Harbor Press, New York (1988); Goding, *Monoclonal antibodies, Principles and Practice* (2d ed.) Academic Press, New York (1986). Monoclonal antibodies are tested for specific immunoreactivity with a variant gene product and

lack of immunoreactivity to the corresponding prototypical gene product. These antibodies are useful in diagnostic assays for detection of the variant form, or as an active ingredient in a pharmaceutical composition.

IV. Kits

The invention further provides kits comprising at least one allele-specific oligonucleotide as described above. Often, the kits contain one or more pairs of allele-specific oligonucleotides hybridizing to different forms of a polymorphism. In some kits, the allele-specific oligonucleotides are provided immobilized to a substrate. For example, the same substrate can comprise allele-specific oligonucleotide probes for detecting at least 10, 100 or all of the polymorphisms shown in Figures 5A-5QQQQQQQ. Optional additional components of the kit include, for example, restriction enzymes, reverse-transcriptase or polymerase, the substrate nucleoside triphosphates, means used to label (for example, an avidin-enzyme conjugate and enzyme substrate and chromogen if the label is biotin), and the appropriate buffers for reverse transcription, PCR, or hybridization reactions. Usually, the kit also contains instructions for carrying out the methods.

From the foregoing, it is apparent that the invention includes a number of general uses that can be expressed concisely as follows. The invention provides for the use of any of the nucleic acid segments described above in the diagnosis or monitoring of diseases, such as coronary artery disease, diabetes, coagulation disorders, lipid metabolism disorders, energy metabolism disorders, diseases of the blood, blood vessels and cardiovascular system, and infection by microorganisms, as well as psychological disorders (e.g., bipolar disorder, psychiophrenia). The invention further provides for the use of any of the nucleic acid segments in the manufacture of a medicament for the treatment or prophylaxis of such diseases. The invention further provides for the use of any of the DNA segments as a pharmaceutical.

While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without

departing from the spirit and scope of the invention as defined by the appended claims.

CLAIMS

What is claimed is:

1. A nucleic acid molecule selected from the group consisting of the genes listed in Figures 5A-5QQQQQQQ, wherein said nucleic acid molecule is at least 5 nucleotides in length and comprises a polymorphic site identified in Figures 5A-5QQQQQQQ, wherein a nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.

2. A nucleic acid molecule according to Claim 1, wherein said nucleic acid molecule is at least 10 nucleotides in length.

3. A nucleic acid molecule according to Claim 1, wherein said nucleic acid molecule is at least 20 nucleotides in length.

4. A nucleic acid molecule according to Claim 1, wherein the nucleotide at the polymorphic site is the variant nucleotide for the gene listed in Figures 5A-5QQQQQQ.

5. An allele-specific oligonucleotide that hybridizes to a portion of a gene selected from the group consisting of the genes listed in Figures 5A-5QQQQQQ, wherein said portion is at least 5 nucleotides in length and comprises a polymorphic site identified in Figures 5A-5QQQQQQ, wherein a nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.

6. An allele-specific oligonucleotide according to Claim 5 that is a probe.

7. An allele-specific oligonucleotide according to Claim 5, wherein a central position of the probe aligns with the polymorphic site of the portion.

8. An allele-specific oligonucleotide according to Claim 5 that is a primer.

9. An allele-specific oligonucleotide according to Claim 8, wherein the 3' end of the primer aligns with the polymorphic site of the portion.

10. An isolated gene product encoded by a nucleic acid molecule according to Claim 1.

11. A method of analyzing a nucleic acid sample, comprising obtaining the nucleic acid from an individual sample; and determining a base occupying any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ.

12. A method according to Claim 11, wherein the nucleic acid sample is obtained from a plurality of individuals, and a base occupying one of the polymorphic positions is determined in each of the individuals, and the method further comprising testing each individual for the presence of a disease phenotype, and correlating the presence of the disease phenotype with the base.

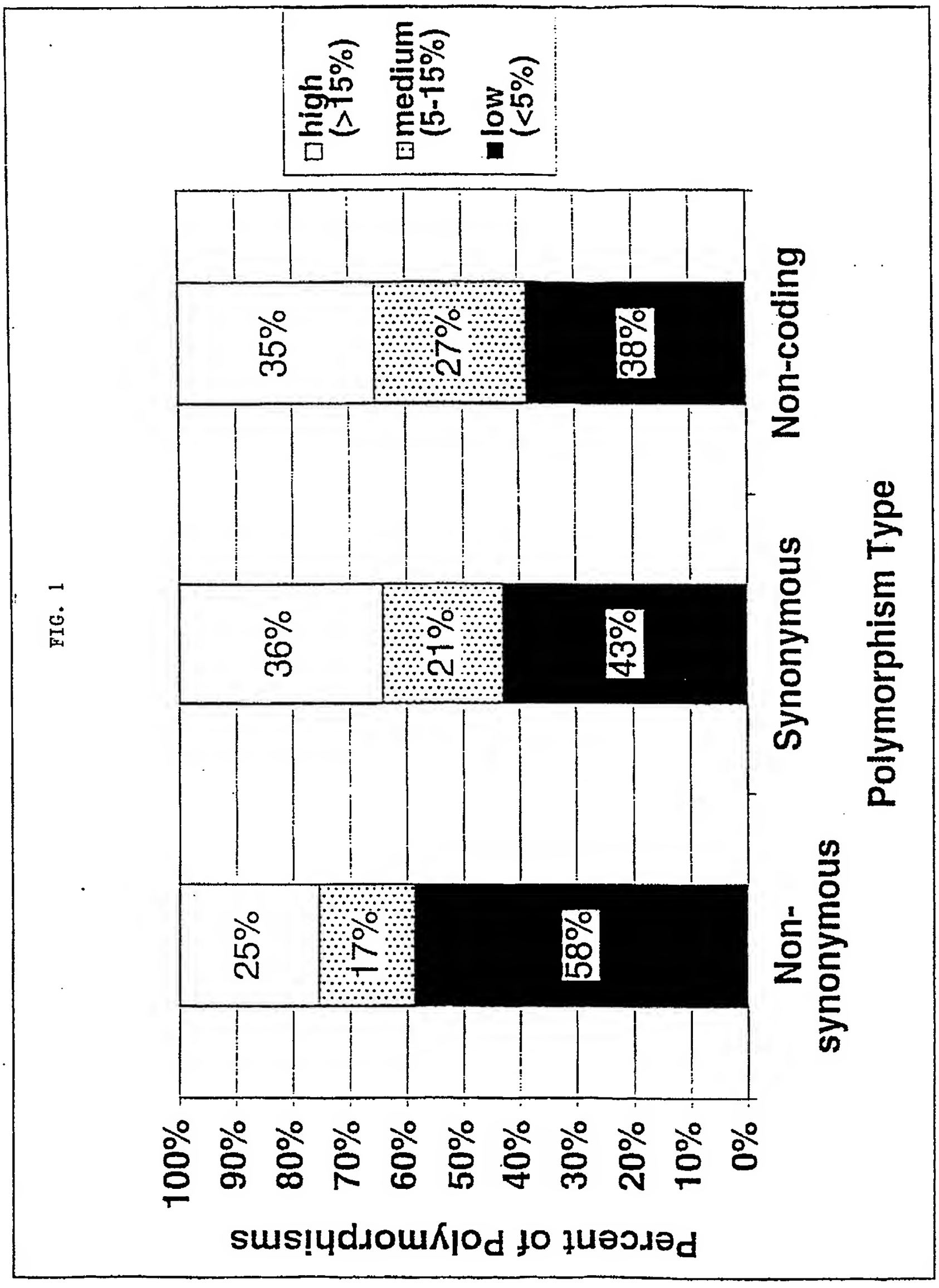
high (>15%)
medium (5-15%)
low (<5%)
Synonymous
Non-coding
Non-synonymous
Polymorphism Type
Percent of Polymorphisms
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
35%
27%
38%
36%
21%
43%
25%
17%
58%

FIG. 1

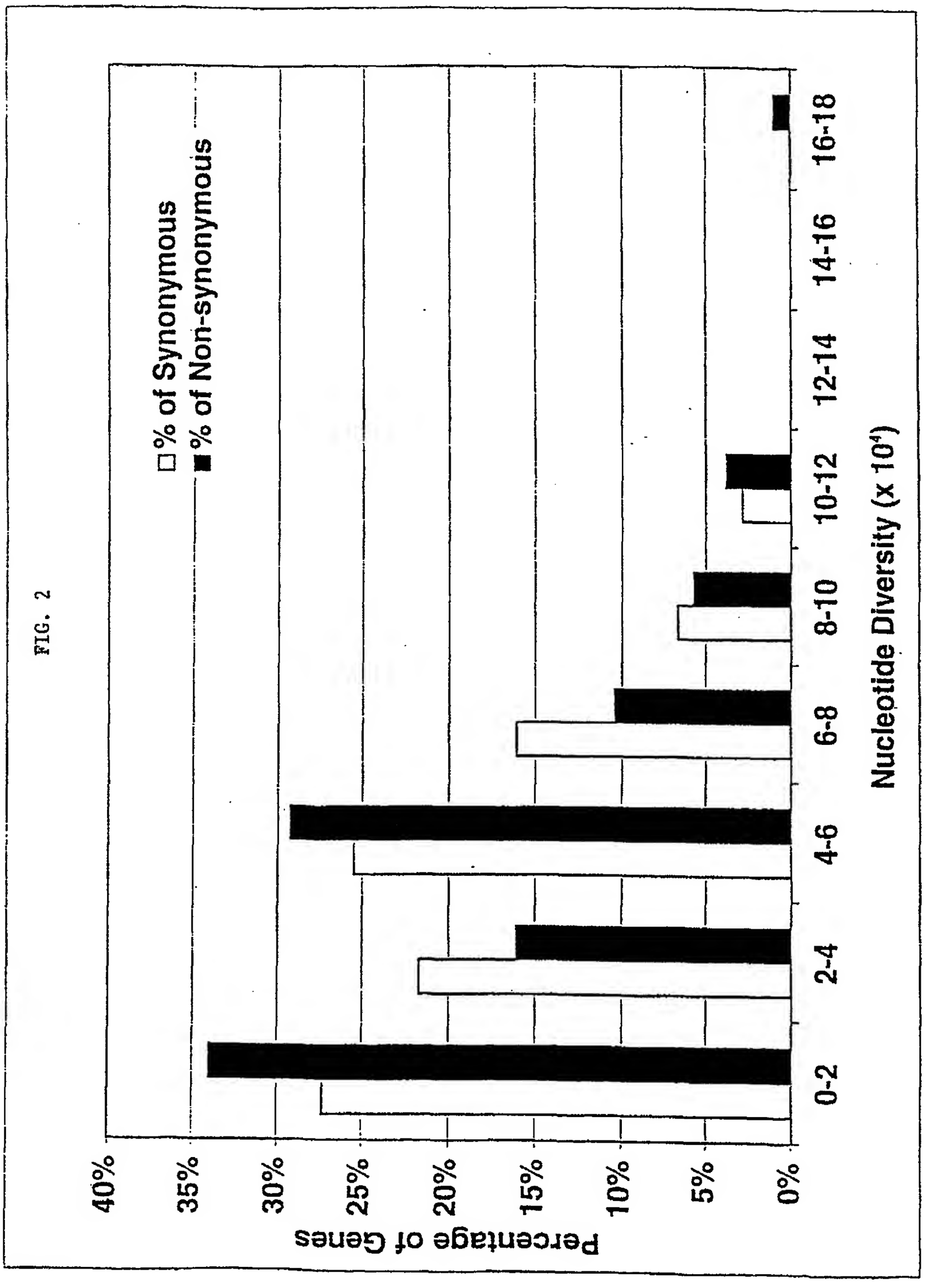
□% of Synonymous
■% of Non-synonymous
Percentage of Genes
40%
35%
30%
25%
20%
15%
10%
5%
0%
Nucleotide Diversity (x 10⁴)
0-2
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18

FIG. 2

Gene	coding bp screened	No. Synonymous polymorphisms	No. Non-synonymous polymorphisms	Non-coding bp screened	No. Non-coding polymorphisms
AADC	1229	0	2	311	0
ADORA2	332	0	1	75	0
AHC	1413	0	0	63	1
ANX3	929	2	4	725	6
APOD	570	1	3	383	1
AR	2759	3	1	300	0
AT3	1357	3	0	121	0
BDNF	744	0	1	212	0
CD36	1209	1	1	252	0
CETP	1397	4	4	299	0
CGA	349	1	0	235	0
CLanalog	1461	3	2	12	0
CNTF	603	0	1	154	0
COMT	783	2	1	241	1
CRH	51	0	0	745	3
CYP11A	1556	1	1	547	0
CYP11B1	1410	7	7	496	9
CYP11B2	1512	7	8	906	4
CYP17	1395	3	0	36	0
CYP21	1488	5	11	542	7
DBH	1266	0	2	49	0
DRD1	1341	1	0	81	0
DRD2	1032	2	0	1379	3
DRD3	719	0	1	145	0
DRD5	1408	2	1	34	0
F10	1369	3	2	416	1
F11	1878	7	4	1312	2
F13A1	2199	3	6	948	4
F13B	1952	4	6	2339	4
F2	1740	3	2	292	0
F2R	1202	2	1	13	0
F3	875	0	1	92	0
F5	6564	13	16	1542	8
F7	1262	4	2	1209	2
F9	1364	0	1	1062	2
FGA	1935	2	2	490	0
FGB	1476	7	3	1057	0
FGG	1252	0	2	1392	2
FSH	355	1	1	44	0
FSHR	1683	1	3	0	0
GABRB1	1425	5	0	804	2
GAP43	675	1	1	79	0
GH1	644	0	1	426	5
GHR	1765	1	6	391	1
GNRHR	237	0	1	513	0
GP1BA	1881	2	2	48	0
GP1BB	1238	0	0	73	0
GP5	1683	0	0	52	0
GP9	534	1	0	143	0
GRF	224	0	0	239	0
GRIN1	1681	1	0	553	0
GRL	2334	4	3	4028	5
HCF2	1500	3	3	64	1

FIG. 3A

Gene	coding bp screened	No. Synonymous polymorphisms	No. Non-synonymous polymorphisms	Non-coding bp screened	No. Non-coding polymorphisms
HMGCR	1724	0	1	12	1
HSD3B1	1122	3	2	653	1
HSD3B2	1122	1	1	723	2
HTR1A	1272	1	0	1189	1
HTR1D	1134	1	1	46	0
HTR1DB	1173	2	0	85	1
HTR1E	1098	1	1	70	0
HTR1EL	1101	1	0	46	0
HTR2A	1398	2	3	1709	9
HTR2C	1245	0	1	138	0
HTR5A	1062	2	0	34	0
HTR6	437	1	0	34	0
HTR7	1279	0	0	138	0
IGF1	630	0	0	7250	8
IGF2	546	0	0	610	1
ITGA2B	2833	4	3	707	0
ITGB3	2131	4	3	163	0
KLK2	297	0	1	279	2
LCAT	1289	1	2	90	0
LDLR	2101	7	3	38	0
LIPC	1471	4	3	754	4
LPL	409	1	1	48	0
MAOA	1032	1	0	69	0
MAOB	980	1	0	135	0
MPL	1748	1	2	903	1
NGFB	726	1	1	1186	5
NOS1	127	0	0	56	0
NT3	774	1	0	150	0
NTRK1	1961	5	2	1106	0
PACE	1500	2	0	1095	4
PAI1	1171	1	2	911	1
PAI2	1248	5	4	915	5
PC1	1881	1	3	456	1
PCI	1221	5	5	576	4
POMC	132	0	0	520	0
PRL	633	1	1	180	1
PROC	1334	3	0	114	0
PROS1	1868	1	0	557	0
PTAFR	1029	0	2	13	0
PTH	348	1	0	230	2
PTHLH	634	0	0	2342	13
SELP	2096	5	8	14	0
SHBG	1209	1	3	494	1
SLC6A1	1388	2	0	547	2
SLC6A3	1496	6	1	205	0
SLC6A4	1623	1	2	824	1
TBXA2R	1006	1	0	12	0
TBXAS1	1605	1	6	1411	1
TFPI	806	0	1	139	0
TH	965	1	1	104	0
THBD	1728	0	0	26	0
THPO	1049	0	0	632	2
VLDLR	2391	3	1	850	2
ALL GENES	135823	203	192	59552	150

FIG. 3B

Polymorphism rates for different classes of sites. Nucleotide diversity and heterozygosity (π) are expressed x 10^4.

						Adjusted for frequency of sites*		
Polymorphism Type	bp screened	No. polys	Frequency (SNP/bp)	$\hat{\theta}$	π	Frequency (SNP/bp)	$\hat{\theta}$	π
Non-coding	**59,552**	**150**	**1/397**	**4.93 ± 1.24**	**5.05 ± 2.40**			
Coding	**135,823**	**395**	**1/344**	**5.47 ± 1.32**	**5.07 ± 2.40**			
synonymous		203	1/669	2.81 ± 0.68	2.98 ± 1.42	1/191	9.84 ± 2.38	10.43 ± 4.97
non-synonymous		192	1/707	2.66 ± 0.64	2.06 ± 0.98	1/504	3.73 ± 0.90	2.89 ± 1.37
conservative		122	1/1113	1.69 ± 0.41	1.44 ± 0.68	1/389	4.94 ± 1.19	4.21 ± 1.99
non-conservative		70	1/1940	0.97 ± 0.23	0.63 ± 0.30	1/705	2.61 ± 0.63	1.70 ± 0.81
four-fold degenerate sites	21,645	111	1/195	9.64 ± 2.32	9.26 ± 4.40			
two-fold degenerate sites	34,294	125	1/274	6.85 ± 1.65	5.33 ± 2.53			
non-degenerate sites	79,659	157	1/507	3.70 ± 0.89	2.52 ± 1.19			
Total	**195,375**	**545**	**1/357**	**5.31 ± 1.28**	**5.01 ± 2.38**			

* The number of synonymous sites was calculated as the sum of four-fold degenerate sites and half the number of two-fold degenerate sites; the number of non-synonymous sites is the sum of the non-degenerate sites and half the two-fold degenerate sites. The number of conservative and non-conservative sites is estimated as the proportion of non-synonymous sites at which a nucleotide substitution would create a conservative or non-conservative substitution, calculated as in footnote 21.

FIG. 4

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
AADCd4	AADC	C	T	P	L	cds	GE1048	CACACACCTGT ACAAATCCAA	CTTACAAAGAA AGGAATCAGGC	CACACACCTGTACAAATCCAActctgctgtcttctttccaggcacactcctcagtggaaagagct gggttaattggtggagtgaaattaaaagccatcc[c/t]ctcagatggcaacttcgccatgcgtg cgtctgccctgcaggaagccctggagagagacaaagcggctgGCCTGATTCCTTTCTTTGTAAG	194
AADCd5	AADC	A	G	M	V	cds	GE1048	CACACACCTGT ACAAATCCAA	CTTACAAAGAA AGGAATCAGGC	CACACACCTGTACAAATCCAActctgctgtcttctttccaggcacactcctcagtggaaagagct gggttaattggtggagtgaaattaaaagccatcccctcagatggcaacttcgcc[a/g]tgcgtg cgtctgccctgcaggaagccctggagagagacaaagcggctgGCCTGATTCCTTTCTTTGTAAG	194
AADCd6	AADC	G	A	V	M	cds	GE1094.	CACTGAATCAT TTTCTTTCTGC	ACACACTTACC CCAGGC	CACTGAATCATTTTCTTTCTGCagttttcacctctgacagagcccagacaccatgaacgcaagtg aattccgaaggagagggaaggagatggtggattac[g/a]tggccaactacatggaaggcattga gggacgccaggtctaccctgacgtggagcccgggtacctgcggccgctgatccctgccgctgccc ctcaggagccagacacgtttgaggacatcatcaacgacgttgagaagataatcatGCCTGGGGTA AGTGTGT	267
AADCd7	AADC	C	T	D	D	cds	GE1263	CCCTTGTTACT GCTGACCCC	CACTCCTCCCC CTTCTC	CCCTTGTTACTGCTGACCCCcaaatttatgcaatgctnggccctctggataatccattcccttcc cccacgacaggcggcaagcccagcatgcacagagctggagactgtgatgatgga[c/t]tggctc gggaagatgctggaactaccaaaggcatttttgaatgagaaagctgGAGAAGGGGGAGGAGTG	193
AADCu1	AADC	C	T	R	W	cds	GE1094	CACTGAATCAT TTTCTTTCTGC	ACACACTTACC CCAGGC	CACTGAATCATTTTCTTTCTGCagttttcacctctgacagagcccagacaccatgaacgcaagtg aattccgaaggagagggaaggagatggtggattacgtggccaactacatggaaggcattgaggga cgccaggtctaccctgacgtggagcccgggtacctg[c/t]ggccgctgatccctgccgctgccc ctcaggagccagacacgtttgaggacatcatcaacgacgttgagaagataatcatGCCTGGGGTA AGTGTGT	267
AADCu2	AADC	A	G	E	G	cds	GE1094	CACTGAATCAT TTTCTTTCTGC	ACACACTTACC CCAGGC	CACTGAATCATTTTCTTTCTGCagttttcacctctgacagagcccagacaccatgaacgcaagtg aattccgaaggagagggaaggagatggtggattacgtggccaactacatggaaggcattgaggga cgccaggtctaccctgacgtggagcccgggtacctgcggccgctgatccctgccgctgcccca ggagccagacacgtttg[a/g]ggacatcatcaacgacgttgagaagataatcatGCCTGGGGTA AGTGTGT	267
AADCu3	AADC	A	T	I	I	cds	GE1004	TCCATCTGGGG ACTCAC	GTGCACCTACC TCCACTC	TCCATCTGGGGACTCACaagttgattctgaactttaggcaacaaggaagacat[a/t]tggctgc acgttgatgcagcctacgcaggcagtgcattcatctgccctgagttccggcaccttctgaatgGA GTGGAGGTAGGTGCAC	146
ADORA2 u1	ADORA 2	C	T	A	V	cds	GE1141	ATGGACCGTGA GCTGGC	AAGCCTGGGCA CCAACA	ATGGACCGTGAGCTGGCccagcccgcgtccgtgctgagcctgcctgtcgtctgtggccatgccca tcatgggctcctcggtgtacatcacggtggagctggccattgctgtgctggccatcctgggcaat gtgctggtgtgctgggccgtgtggctcaacagcaacctgcagaacgtcaccaactactttgtggt gtcactggcgg[c/t]ggccgacatcgcagtgggtgtgctcgccatccccctttgccatcaccatc agcaccgggttctgcgctgcctgccacggctgcctcttcattgcctgcttcgtcctggtcctcac gcagagctccatcttcagtctcctggccatcgccattgaccgctacattgccatccgcatcccgc tccggtgagcagggccggggttacatctgtgcaaaggcTGTTGGTGCCCAGGCTT	445
ADORA2 u2	ADORA 2	C	G	P	P	cds	GE1141	ATGGACCGTGA GCTGGC	AAGCCTGGGCA CCAACA	ATGGACCGTGAGCTGGCccagcccgcgtccgtgctgagcctgcctgtcgtctgtggccatgcc[c /g]atcatgggctcctcggtgtacatcacggtggagctggccattgctgtgctggccatcctggg caatgtgctggtgtgctgggccgtgtggctcaacagcaacctgcagaacgtcaccaactactttg tggtgtcactggcggcggccgacatcgcagtgggtgtgctcgccatccccctttgccatcaccatc agcaccgggttctgcgctgcctgccacggctgcctcttcattgcctgcttcgtcctggtcctcac gcagagctccatcttcagtctcctggccatcgccattgaccgctacattgccatccgcatcccgc tccggtgagcagggccggggttacatctgtgcaaaggcTGTTGGTGCCCAGGCTT	445

FIG. 5A

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
AHCu1	AHC	T	C	C	C	cds	GE1200	CGCTAGGTATA AATAGGTCCCA G	CTGCGGGTGGT CTTCACC	CGCTAGGTATAAATAGGTCCCAGgaggcagccactgggcagaactgggctacgggcgccgcgggc catggcgggccagaaccaccagtggcagggcagcatcctctacaacatgcttatgagcgcgaagc aaacgcgcgcggctcctgaggctccagagacgcggctggtggatcagtg[t/c]tggggctgttc gtgcggcgatgagcccggggtgggcagagaggggctgctgggcgggcggaacgtggcgctcctgt accgctgctgcttttgcggtaaagaccacccacggcagggcagcatcctctacagcatgctgacg agcgcaaagcaaacgtacgcggcaccgaaggcgcccgaggcgacgctgggtccgtgctggggctg ttcgtgcggctctgatcccggggtgggcagagcggggcttccgggtgggcggcccgtggcactcc tgtaccgctgctgcttttgtggtgaagaccacccgcggcagggcagcatcctctacagcttgctc actagctcaaagcaaacgcacgtggctccggcagcgcccgaggcacggccaggggcgcgtggtg ggaccgctcctacttcgcgcagaggccaggggtaaagaggcgctaccaggcgggcgggccacgg cgcttctgtaccgctgctgcttttgcGGTGAAGACCACCCGCAG	694
AHCu2	AHC	G	A	R	R	cds	GE1200	CGCTAGGTATA AATAGGTCCCA G	CTGCGGGTGGT CTTCACC	CGCTAGGTATAAATAGGTCCCAGgaggcagccactgggcagaactgggctacgggcgccgcgggc catggcgggccagaaccaccagtggcagggcagcatcctctacaacatgcttatgagcgcgaagc aaacgcgcgcggctcctgaggctccagagacgcggctggtggatcagtgttggggctgttcgtgc ggcgatgagcccggggtgggcagagaggggctgctgggcgggcggaacgtggcgctcctgtaccg ctgctgcttttgcggtaaagaccacccacggcagggcagcatcctctacagcatgctgacgagcg caaagcaaacgtacgcggcaccgaaggcgcccgaggcgacgctgggtccgtgctggggctgttcg tgcggctctgatcccggggtgggcagagcggggcttccgggtgggcggcccgtggcactcctgta ccgctgctgcttttgtggtgaagaccacccgcggcagggcagcatcctctacagcttgctcacta gctcaaagcaaacgcacgtggctccggcagcgcccgaggcacg[g/a]ccaggggcgcgtggtg ggaccgctcctacttcgcgcagaggccaggggtaaagaggcgctaccaggcgggcgggccacgg cgcttctgtaccgctgctgcttttgcGGTGAAGACCACCCGCAG	694
AHCu3	AHC	C	T	-	-	noncoding	GE643	GGACTCTGTGG TGAGCTGTTTT AT	TTCTTCCCTCA TGGTGAACTG	GGACTCTGTGGTGAGCTGTTTTATaacaaagagatttttctcc[c/t]tccagacgtgccgggcc tgcagtgcgtgaagtacattcagggactccagtggggaactcagcaaatactcagtgaacacacc aggatgacgcaccaagggccccatgacagattcatcgaacttaatagtacccttttcctgctgag attcatcaatgccaatgtcattgctgaactgttcttcaggcccatcatcggcacagtcagcatgg atgatatgatgctggaaatgctctgtacaaagatataaagtcatgtgggccacacaagtgcagta gtgCAGTTCACCATGAGGGAAGAA	349
AHCu4	AHC	G	A	P	P	cds	GE1200	CGCTAGGTATA AATAGGTCCCA G	CTGCGGGTGGT CTTCACC	CGCTAGGTATAAATAGGTCCCAGgaggcagccactgggcagaactgggctacgggcgccgcgggc catggcgggccagaaccaccagtggcagggcagcatcctctacaacatgcttatgagcgcgaagc aaacgcgcgcggctcctgaggctccagagacgcggctggtggatcagtgttggggctgttcgtgc ggcgatgagcccggggtgggcagagaggggctgctgggcgggcggaacgtggcgctcctgtaccg ctgctgcttttgcggtaaagaccacccacggcagggcagcatcctctacagcatgctgacgagcg caaagcaaacgtacgcggcaccgaaggcgcccgaggcgacgctgggtccgtgctggggctgttcg tgcggctctgatcccggggtgggcagagcggggcttccgggtgggcggcccgtggcactcctgta ccgctgctgcttttgtggtgaagaccacccg[g/a]cggcagggcagcatcctctacagcttgctc actagctcaaagcaaacgcacgtggctccggcagcgcccgaggcacggccaggggcgcgtggtg ggaccgctcctacttcgcgcagaggccaggggtaaagaggcgctaccaggcgggcgggccacgg cgcttctgtaccgctgctgcttttgcGGTGAAGACCACCCGCAG	694

FIG. 5B

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
AHCu5	AHC	A	G	Q	R	cds	GE654	TAAAGAGGCGC TACCAGGCG	TGAGCTGGGAA AAGCCG	TAAAGAGGCGCTACCAGGCGGgcgggccacggcgcttctgtaccgctgctgcttttgcggtgaag accacccgc[a/g]gcagggcagcaccctctactgcgtgcccacgagcacaaatcaagcgcaggc ggctccggaggagcggccgagggccccctggtgggacacctcctctggtgcgctgcggccggtgg cgctcaagagtccacaggtggtctgcgaggcagcctcagcgggcctgttgaagacgctgcgcttc gtcaagtacttgccctgcttccaggtgctgcccctggaccagcagctggtgctggtgcgcaactg ctgggcgtccctgctcatgcttgagctggcccaggaccgcttgcagttcgagactgtggaagtct cggagcccagcatgctgcagaagatcctcaccaccaggcggcgggagaccgggggcaacgagcca ctgcccgtgcccacgctgcagcaccatttggcaccgccggcggaggccaggaaggtgccctccgc ctcccaggtccaagccatcaagtgctttctttccaaatgctggagtctgaacatcagtaccaagg agtacgcctacctcaaggggaccgtgctctttaacccgggtaagggtactggccttaggcgcCGG CTTTTCCCAGCTCA	664
AHCu6	AHC	T	G	L	R	cds	GE654	TAAAGAGGCGC TACCAGGCG	TGAGCTGGGAA AAGCCG	TAAAGAGGCGCTACCAGGCGGgcgggccacggcgcttctgtaccgctgctgcttttgcggtgaag accacccgcagcagggcagcaccctctactgcgtgcccacgagcacaaatcaagcgcaggcggct ccggaggagcggccgagggccccctggtgggacacctcctctggtgcgctgcggccggtggcgct caagagtccacaggtggtctgcgaggcagcctcagcgggcctgttgaagacgctgcgcttcgtca agtacttgccctgcttccaggtgctgcccctggaccagcagctggtgctggtgcgcaactgctgg gcgtccctgctcatgc[t/g]tgagctggcccaggaccgcttgcagttcgagactgtggaagtct cggagcccagcatgctgcagaagatcctcaccaccaggcggcgggagaccgggggcaacgagcca ctgcccgtgcccacgctgcagcaccatttggcaccgccggcggaggccaggaaggtgccctccgc ctcccaggtccaagccatcaagtgctttctttccaaatgctggagtctgaacatcagtaccaagg agtacgcctacctcaaggggaccgtgctctttaacccgggtaagggtactggccttaggcgcCGG CTTTTCCCAGCTCA	664
ANX3d15	ANX3	T	C	F	S	cds	GE444	TCTCTATGTTG CTTTGTGACCA AT	GACTTACTTTA ATTGCTGAATA TAGG	TCTCTATGTTGCTTTGTGACCAATgacatttgtgttgtgaacacctgcattccttaacagggtat tggaactgatgagtttactctgaaccgaataatggtgtccagatcagaaattgacctttggaca ttcgaacagagt[t/c]caagaagcattatggctattcCCTATATTCAGCAATTAAAGTAAGTC	194
ANX3d16	ANX3	G	A	-	-	noncoding	GE444	TCTCTATGTTG CTTTGTGACCA AT	GACTTACTTTA ATTGCTGAATA TAGG	TCTCTATGTTGCTTTGTGACCAATgacatttgt[g/a]ttgtgaacacctgcattccttaacagg gtattggaactgatgagtttactctgaaccgaataatggtgtccagatcagaaattgacctttg gacattcgaacagagttcaagaagcattatggctattcCCTATATTCAGCAATTAAAGTAAGTC	194
ANX3d17	ANX3	A	T	-	-	noncoding	GE453	TGTTGGCATTT AAACTTTTCTC	AAAAATTGTTA TTGAGCATGCA G	TGTTGGCATTTAAACTTTTCTCtgttttataatcatatttttcagtttgtcaaggcttaatttca ttctgatttggtttcagtatacaagaagagtcttggagatgacattagttccgaaacatctggtg acttccggaaagctctgttgactttggcagatgtaaggttttatttttttatttt[a/t]taactc cccagtaagCTGCATGCTCAATAACAATTTTT	227
ANX3d18	ANX3	T	C	-	-	noncoding	GE433	TTACTTACTAT AGATTAACCCA ATTTC	TTTCCCAAGGG AATTAAGGG	TTACTTACTATAGATTAACCCAATTTCtattccgtgaagctgaacat[t/c]atttgctttttgt tacagttaattgtgtgaggaacacgccggccttttagccgaaagactgcatcgagccttgaagg ttggtctggaaagttcatgtgcattcttagcgtCCCTTAATTCCCTTGGGAAA	183
ANX3d19	ANX3	T	C	-	-	noncoding	GE439	TGATTCATTTA TGGTCTCCCAT T	GAAGTAAGGTG GAGCTGTTGG	TGATTCATTTATGGTCTCCCATTatttatactgtatttgtttttcattgattttattctttgcag tcggatacttctggagactatgaaatcacactcttaaaaatctgtggtggagatgactgaaccaa gaagataatctccaaaggtccacgatgggcttt[t/c]CCAACAGCTCCACCTTACTTC	189
ANX3d20	ANX3	T	C	-	-	noncoding	GE439	TGATTCATTTA TGGTCTCCCAT T	GAAGTAAGGTG GAGCTGTTGG	TGATTCATTTATGGTCTCCCATTatttatactgtatttgtt[t/c]ttcattgattttattcttt gcagtcggatacttctggagactatgaaatcacactcttaaaaatctgtggtggagatgactgaa ccaagaagataatctccaaaggtccacgatgggcttttCCAACAGCTCCACCTTACTTC	189
ANX3u1	ANX3	T	C	-	-	noncoding	GE443	GATGTCATTTT GAACCAATG	TGTAACTTGCC TGATTTGCTTC	GATGTCATTTTGAACCAATGgactttcaagtatttccttctaggttggacaccgaggaacagtaa gagattatccagactttagcccatcagtggatgctgaagctattcagaaagcaatcagaggaatt ggtgagtga[t/c]attttacaattcctttcttaatgttGAAGCAAATCAGGCAAGTTACA	191

FIG. 5C

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ANX3u9	ANX3	G	A	S	N	cds	GE443	GATGTCATTTT GAACCAATG	TGTAACTTGCC TGATTTGCTTC	GATGTCATTTTGAACCAATGgactttcaagtatttccttctaggttggacaccgaggaacagtaa gagattatccagacttta[g/a]cccatcagtggatgctgaagctattcagaaagcaatcagagg aattggtgagtgatattttacaattccttttcttaatgttGAAGCAAATCAGGCAAGTTACA	191
APODd7	APOD	T	C	F	S	cds	GE320	AGAAGGCTCAG AATGACAACC	CAGCATAATTA CATTGAACCTT GTAG	AGAAGGCTCAGAATGACAACCcagctgctttgcgttcccgcagctccaggtccctttctccagcc acccagccccaagatggtgatgctgctgctgctgctttccgcactggctggcctct[t/c]cggt gcggcagagggacaagcatttcatcttgggaagtgccccaatcctccggtgcaggagaattttga cgtgaataaggtaaaaggcgaacctcccgtttgttttgctgcctccgctgtgaataagcgttCTA CAAGGTTCAATGTAATTATGCTG	283
APODd8	APOD	C	G	-	-	noncoding	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaaatatcctgacttctaataacattgatgt caagaaaatgacggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctacaggga ggctgcacccactccatgttacttctgcttcgctttcccctaccccacccccc[c/g]ccataaA GACAAACCAATCAACCACGA	410
APODd9	APOD	C	A	-	-	noncoding	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaaatatcctgacttctaataacattgatgt caagaaaatgacggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctacaggga ggctgcacccactccatgttacttctgcttcgctttcccctaccccacccccccccata[c/a]A GACAAACCAATCAACCACGA	410
APODu1	APOD	A	T	E	V	cds	GE304	CTGCGTCTGCA CGACAATG	ACCCAGTCACT CTGCGTCA	CTGCGTCTGCACGACAATGgggaagaagttgcaggtccccagagaaccacagggttttgct.ctgc ttgttgtctctgcagtatctcggaagatggtacgaaattgagaagatcccaacaaccttttg[a/t]gaatggacgctgcatccaggccaactactcactaatggaaaacggaaagatcaaagtgttaaac caggagttgaggtgagtggctgtgggcgtccggggccaggcctgcggagtgcTGACGCAGAGTGA CTGGGT	266
APODu2	APOD	C	T	D	D	cds	GE320	AGAAGGCTCAG AATGACAACC	CAGCATAATTA CATTGAACCTT GTAG	AGAAGGCTCAGAATGACAACCcagctgctttgcgttcccgcagctccaggtccctttctccagcc acccagccccaagatggtgatgctgctgctgctgctttccgcactggctggcctcttcggtgcgg cagagggacaagcatttcatcttgggaagtgccccaatcctccggtgcaggagaattttga[c/t]gtgaataaggtaaaaggcgaacctcccgtttgttttgctgcctccgctgtgaataagcgttCTA CAAGGTTCAATGTAATTATGCTG	283
APODu3	APOD	T	G	S	A	cds	GE286	GCTTATTGGCT TTCAATGAGTT GT	TGTCTCAGGAA TTCTCCAAGC	GCTTATTGGCTTTCAATGAGTTGTttttcttttctctttcgttttttgtatttttctttttttt aactcactgcagagctgatggaactgtgaatcaaatcgaaggtgaagccaccccagttaacctca cagagcctgccaagctggaagttaagttt[t/g]cctggtgtaagtatccacttttcccaggagg attcagggacaggaaatatgcaaactgaaggctagcgccccgGCTTGGAGAATTCCTGAGACA	258
APODu4	APOD	C	T	S	L	cds	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccat[c/t]ggcaccgtactggatcctggccaccgactatgagaactatgcc ctcgtgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaag aaaccctaatctccctccagaaacagtggactctctaaaaaatatcctgacttctaataacattg atgtcaagaaaatgacggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctaca gggaggctgcacccactccatgttacttctgcttcgctttcccctaccccacccccccccataaA GACAAACCAATCAACCACGA	410

FIG. 5E

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ANX3u10	ANX3	T	G	L	R	cds	GE447	AAAAAGTATTTCACATTTTTCC C	TGATGACTTGGTCAAACCC	AAAAAGTATTTCACATTTTTCCCcttggttttttgattttaggagc[t/g]gaaagatgacttgaagggtgatctctctggccactttgagcatctcatggtggccctagtgactccaccagcagtctttgatgcaaagcagctaaagaaatccatgaaggtatgagcccccccacaagccatttctgcccaGGGTTTGACCAAGTCATCA	210
ANX3u11	ANX3	A	G	P	P	cds	GE447	AAAAAGTATTTCACATTTTTCC C	TGATGACTTGGTCAAACCC	AAAAAGTATTTCACATTTTTCCCcttggttttttgattttaggagctgaaagatgacttgaagggtgatctctctggccactttgagcatctcatggtggccctagtgactcc[a/g]ccagcagtctttgatgcaaagcagctaaagaaatccatgaaggtatgagcccccccacaagccatttctgcccaGGGTTTGACCAAGTCATCA	210
ANX3u12	ANX3	T	G	L	R	cds	GE441	AAAAAGAAATAATTGTGTCTCT AATATC	TGTAAAAACAACATACAACACAAAGG	AAAAAGAAATAATTGTGTCTCTAATATCattctcttgtgaatagattctctataaagctggtgagaacagatggggcacggatgaagacaaattcactgagatcc[t/g]gtgtttaaggagctttcctcaattaaaactaagtacaaactcaccattacaatCCTTTGTGTTGTATGTTGTTTTTACA	189
ANX3u13	ANX3	A	G	T	T	cds	GE460	ATTCAAATGTGCTCAACTGC	CTGAGTTAAAGCAAGTGCAA	ATTCAAATGTGCTCAACTGCgttgctttaaataattttgtggtgcttcttttttagc[a/g]tttgatgaatacagaaatatcagccaaaaggacattgtggacagcataaaaggagaattatctgggcatttttgaagacttactgttggccataggtaagacttcgagtgctggtaaactaagttactTTGCACTTGCTTTAACTCAG	208
ANX3u14	ANX3	T	A	I	N	cds	GE460	ATTCAAATGTGCTCAACTGC	CTGAGTTAAAGCAAGTGCAA	ATTCAAATGTGCTCAACTGCgttgctttaaataattttgtggtgcttcttttttagcatttgatgaatacagaaata[t/a]cagccaaaaggacattgtggacagcataaaaggagaattatctgggcatttttgaagacttactgttggccataggtaagacttcgagtgctggtaaactaagttactTTGCACTTGCTTTAACTCAG	208
ANX3u2	ANX3	C	A	S	R	cds	GE425	CTTTTTAGGGCGCGGGA	AGCAACATTGGCTAAATATGTG	CTTTTTAGGGCGCGGGAacaaacgaagatgccttgattgaaatcttaactaccaggacaag[c/a]aggcaaatgaaggatatctctcaagcctattatacaggtgtcttatttctgcttaccttcaccactgttcaCACATATTTAGCCAATGTTGCT	160
ANX3u3	ANX3	C	T	P	L	cds	GE433	TTACTTACTATAGATTAACCCAATTTC	TTTCCCAAGGGAATTAAGGG	TTACTTACTATAGATTAACCCAATTTCtattccgtgaagctgaacattatttgctttttgttacagttaattgtgtgaggaacacgc[c/t]ggccttttagccgaaagactgcatcgagccttgaaggttggtctggaaagttcatgtgcattcttagcgtCCCTTAATTCCCTTGGGAAA	183
ANX3u4	ANX3	A	T	E	V	cds	GE444	TCTCTATGTTGCTTTGTGACCA AT	GACTTACTTTAATTGCTGAATATAGG	TCTCTATGTTGCTTTGTGACCAATgacatttgtgttgtgaacacctgcattccttaacagggtattggaactgatgagtttactctgaaccgaataatggtgtccagatcag[a/t]aattgacctttggacattcgaacagagttcaagaagcattatggctattcCCTATATTCAGCAATTAAAGTAAGTC	194
ANX3u5	ANX3	C	T	-	-	noncoding	GE439	TGATTCATTTATGGTCTCCCAT T	GAAGTAAGGTGGAGCTGTTGG	TGATTCATTTATGGTCTCCCATTatttatactgtatttgtttttcattgattttatt[c/t]tttgcagtcggatacttctggagactatgaaatcacactcttaaaaatctgtggtggagatgactgaaccaagaagataatctccaaaggtccacgatgggctttCCAACAGCTCCACCTTACTTC	189
ANX3u6	ANX3	G	T	-	-	noncoding	GE448	CTTTTGTTCAAGACAAATGTTG AG	TGATCTCTTACTGCCTGTCA	CTTTTGTTCAAGACAAATGTTGAGcataaatattgagtaaaataacttttt[g/t]tttcatttaggaactgatgagaaaatgctcatcagcattctgactgagaggtcaaatgcacagcggcagctgattgttaaggaatatcaagcagcatatggaaaggtaaggtcacattaacaTGACAGGCAGTAAGAGATCA	197
ANX3u7	ANX3	A	T	E	D	cds	GE425	CTTTTTAGGGCGCGGGA	AGCAACATTGGCTAAATATGTG	CTTTTTAGGGCGCGGGAacaaacga[a/t]gatgccttgattgaaatcttaactaccaggacaagcaggcaaatgaaggatatctctcaagcctattatacaggtgtcttatttctgcttaccttcaccactgttcaCACATATTTAGCCAATGTTGCT	160
ANX3u8	ANX3	T	G	-	-	noncoding	GE443	GATGTCATTTTGAACCAATG	TGTAACTTGCCTGATTTGCTTC	GATGTCATTTTGAACCAATGgactttcaagtatt[t/g]ccttctaggttggacaccgaggaacagtaagagattatccagactttagcccatcagtggatgctgaagctattcagaaagcaatcagaggaattggtgagtgatattttacaattcctttcttaatgttGAAGCAAATCAGGCAAGTTACA	191

FIG. 5D

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
APODu5	APOD	C	A	T	K	cds	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaaatatcctgacttctaataacattgatgt caagaaaatga[c/a]ggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctaca gggaggctgcacccactccatgttacttctgcttcgctttcccctaccccaccccccccataaA GACAAACCAATCAACCACGA	410
APODu6	APOD	T	A	L	H	cds	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaaatatcctgacttctaataacattgatgt caagaaaatgacggtcacagaccaggtgaactgccccaagc[t/a]ctcgtaaccaggttctaca gggaggctgcacccactccatgttacttctgcttcgctttcccctaccccaccccccccataaA GACAAACCAATCAACCACGA	410
ARd10	AR	T	G	G	G	cds	GE655	CGGGGTAAGGG AAGTAGGTG	CCTCGCTCAGG ATGTCTTTA	CGGGGTAAGGGAAGTAGGTGgaagattcagccaagctcaaggatggaagtgcagttagggctggg aagggtctaccctcggccgccgtccaagacctaccgaggagctttccagaatctgttccagagcg tgcgcgaagtgatccagaacccgggccccaggcacccagaggccgcgagcgcagcacctcccggc gccagtttgctgctgctgcagcagcagcagcagcagcagcagcagcagcagcagcagcagcagca gcagcagcagcagcaagagactagccccaggcagcagcagcagcagcagggt[g/c]gaggatggt tctccccaagcccatcgtagaggccccacaggctacctggtcctggatgaggaacagcaaccttc acagccgcagtcggccctggagtgccaccccgagagaggttgcgtcccagagcctggagccgccg tggccgccagcaaggggctgccgcagcagctgccagcacctccggacgaggatgactcagctgcc ccatccacgttgtccctgctgggccccacttcccccggcttaagcagctgctccgctgaccttAA AGACATCCTGAGCGAGG	602
ARd11	AR	G	C	E	Q	cds	GE655	CGGGGTAAGGG AAGTAGGTG	CCTCGCTCAGG ATGTCTTTA	CGGGGTAAGGGAAGTAGGTGgaagattcagccaagctcaaggatggaagtgcagttagggctggg aagggtctaccctcggccgccgtccaagacctaccgaggagctttccagaatctgttccagagcg tgcgcgaagtgatccagaacccgggccccaggcacccagaggccgcgagcgcagcacctcccggc gccagtttgctgctgctgcagcagcagcagcagcagcagcagcagcagcagcagcagcagcagca gcagcagcagcagcaagagactagccccaggcagcagcagcagcagcagggt[g/c]aggatggt tctccccaagcccatcgtagaggccccacaggctacctggtcctggatgaggaacagcaaccttc acagccgcagtcggccctggagtgccaccccgagagaggttgcgtcccagagcctggagccgccg tggccgccagcaaggggctgccgcagcagctgccagcacctccggacgaggatgactcagctgcc ccatccacgttgtccctgctgggccccacttcccccggcttaagcagctgctccgctgaccttAA AGACATCCTGAGCGAGG	602
ARd12	AR	G	A	E	E	cds	GE659	CCACTTTCCCC GGCTTA	CGGCCAGAGCC AGTGGA	CCACTTTCCCCGGCTTAagcagctgctccgctgaccttaaagacatcctgagcgaggccagcacc atgcaactccttcagcaacagcagcaggaagcagtatccgaaggcagcagcagcgggagagcgag gga[g/a]gcctcgggggctcccacttcctccaaggacaattacttaggggcacttcgaccatt tctgacaacgccaaggagttgtgtaaggcagtgtcggtgtccatgggcctgggtgtggaggcgtt ggagcatctgagtccaggggaacagcttcgggggattgcatgtacgccccacttttgggagttc cacccgctgtgcgtcccactccttgtgccccattggccgaatgcaaaggttctctgctagacgac agcgcaggcaagagcactgaagatactgctgagtattcccctttcaagggaggttacaccaaagg gctagaaggcgagagcctaggctgctctggcagcgctgcagcagggagctccgggacacttgaac tgccgtctaccctgtctctctacaagtccggagcactggacgaggcagctgcgtaccagagtcgc gactactacaacttTCCACTGGCTCTGGCCG	616

FIG. 5F

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ARd9	AR	C	T	L	L	cds	GE573	CATGCTTCCCC TCCCCA	CAGGCTGTTCT CCCTGATAAA	CATGCTTCCCCTCCCCAttctgtcttcatcccacatcagttccagtggatgggctgaaaaatcaa aaattctttgatgaacttcgaatgaactacatcaaggaact[c/t]gatcgtatcattgcatgca aaagaaaaaatcccacatcctgctcaagacgcttctaccagctcaccaagctcctggactccgtg cagcctgtaagcaaacgatggagggtgcTTTATCAGGGAGAACAGCCTG	244
ARu1	AR	G	A	K	K	cds	GE584	TTCAGTGACAT GTGTTGCAT	AGTGTCTCTCT CTGGAAGGTAA	TTCAGTGACATGTGTTGCATtggtttttttgtgtcttttccagtttggagactgccagggaccatg ttttgcccattgactattactttccaccccagaagacctgcctgatctgtggagatgaagcttct gggtgtcactatggagctctcacatgtggaagctgcaa[g/a]gtcttcttcaaaagagccgctg aaggtaaagggtcttgcacatgcagcttctctttccctttctcctTTACCTTCCAGAGAGAGACA CT	262
ARu2	AR	T	A	L	H	cds	GE575	AAACTTCCCCT CATTCCTTTT	CAAAAGTGGTC CTCTCTGAATC TC	AAACTTCCCCTCATTCCTTTTtcctctgtgtatctccttcccaggtaccgcatgcacaagtcccg gatgtacagccagtgtgtccgaatgaggcacctctctcaagagtttggatggctccaaatcaccc cccaggaattcctgtgcatgaaagcactgctac[t/a]cttcagcattagtaagtgcctagaagt gcagggaatgccccctgagggcacaGAGATTCAGAGAGGACCACTTTTG	244
ARu3	AR	G	C	-	-	noncoding	GE586	TCAGACTTAGC TCAACCCGTC	CCAAGCTGCTG TATTTTAGTGA G	TCAGACTTAGCTCAACCCGTCagtagtacccagactgaccactgcctctgcctcttcttctccag gcttccgcaacttacacgtggacgaccagatggctgtcattcagtactcctggatggggctcatg gtgtttgccatgggctggcgatccttcaccaatgtcaactccaggatgctctacttcgcccctga tctggttttcaatgagtaagt[g/c]ctcctggggcccagagacCTCACTAAAATACAGCAGCTT GG	262
ARu4	AR	T	A	L	*	cds	GE630	TTTTGACCACT GATGATAAATT C	AAATATGATCC CCCTTATCTCA	TTTTGACCACTGATGATAAATTCaagtctctcttccttcccaatagcccggaagctgaagaaact tggtaatctgaaactacaggaggaaggagaggcttccagcaccaccagccccactgaggagacaa cccagaagctgacagtgtcacacattgaaggctatgaatgtcagcccatctttctgaatgtcctg gaagccattgagccaggtgtagtgtgtgctggacacgacaacaaccagcccgactcctttgcagc cttgctctctagcctcaatgaactgggagagagacagcttgtacacgtggtcaagtgggccaagg cct[t/a]gcctggtaaggaaaagggaagtgggagcaTGAGATAAGGGGGATCATATTT	384
ARu5	AR	T	G	S	A	cds	GE1221	TTCATGTGGTA GGATATAATTT CA	TCTGGTCTAAA GAGAGACTAGA AAAT	TTCATGTGGTAGGATATAATTTCAtatcttttctgttctagaaatacccgaagaaagagactctg gaaactcattatcaggtctatcaactcttgtatgtgttctcccagggaaacagaagtacctgtgc gccagcagaaatgattgcactattgataaattccgaaggaaaaattgtcca[t/g]cttgtcgtc ttcggaaatgttatgaagcagggatgactctgggaggtaagatacttttctttctcctcctc cttcctctctccccctttctccctcATTTTCTAGTCTCTCTTTAGACCAGA	310
ARu6	AR	T	G	C	G	cds	GE575	AAACTTCCCCT CATTCCTTTT	CAAAAGTGGTC CTCTCTGAATC TC	AAACTTCCCCTCATTCCTTTTtcctctgtgtatctccttcccaggtaccgcatgcacaagtcccg gatgtacagccagtgtgtccgaatgaggcacctctctcaagagtttggatggctccaaatcaccc cccaggaattcctg[t/g]gcatgaaagcactgctactcttcagcattagtaagtgcctagaagt gcagggaatgccccctgagggcacaGAGATTCAGAGAGGACCACTTTTG	244
ARu7	AR	T	C	S	P	cds	GE659	CCACTTTCCCC GGCTTA	CGGCCAGAGCC AGTGGA	CCACTTTCCCCGGCTTAagcagctgc[t/c]ccgctgaccttaaagacatcctgagcgaggccag caccatgcaactccttcagcaacagcagcaggaagcagtatccgaaggcagcagcagcgggagag cgagggaggcctcgggggctcccacttcctccaaggacaattacttaggggcacttcgaccatt tctgacaacgccaaggagttgtgtaaggcagtgtcggtgtccatgggcctgggtgtggaggcgtt ggagcatctgagtccaggggaacagcttcgggggattgcatgtacgccccactttgggagttc cacccgctgtgcgtcccactccttgtgccccattggccgaatgcaaaggttctctgctagacgac agcgcaggcaagagcactgaagatactgctgagtattcccctttcaagggaggttacaccaaagg gctagaaggcgagagcctaggctgctctggcagcgctgcagcagggagctccgggacacttgaac tgccgtctaccctgtctctctacaagtccggagcactggacgaggcagctgcgtaccagagtcgc gactactacaacttTCCACTGGCTCTGGCCG	616

FIG. 5G

Poly Id	Assay #	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
ARu8	GE568	AR	T	C	S	S	cds	CTCCTTGTCAACCTGTTTTT	GGGCATGAGCT GGGGTG	243 CTCCTTGTCAACCCTGTTTTTctcccctcttattgttccctacaga ttcactttgacctgctaatcaagtcacacatggtgagcgtggac gatcatctctgtgcaagtgcccaagatcctttc(t/c)gggaaag acccagtgaagcattggaaaccctatttcccCACCCCAGCTCATG
BDNFu1	GE1184	BDNF	G	A	V	M	cds	AAGCCCTAACCAGTTTTCTG	GTTTCCCTTCT GGTCATGGA	100 AAGCCCTAACCAGTTTTCTGtcttgtttctgcttttctccctacag gatgaccatccttttcctactatggttattttcatacttttggttg aagaagcaaacatccgaggacaaaggtggcttggcctacccaggtg gagagcgtgaatgggcccaaggcaggttcaagaggctgacatca c(g/a)tgatagaagagctgttggatgaggaccagaaagttcggcca gacgcagacttgtacacgtccagggtgatgctcagtagtcaagtg ctttctgctggaggaatacaaaaattacctagatgctgcaaacat actctgaccctgcccgcgaggggagctgagcgtgtgtgacagtg gcagacaaaaagactgcagtggacatgtcgggcgggacggtcaca atcaaaaggccaactgaagcaatacttctacgagaccaagtgcaa aaggctgcaggggcatagacaaaaggcattggaactcccagtgcc cgggccctaccatggatagcaaaaagagaattggctggcgattc tgtatgtacattgaccattaaaagggaagatagtggatttatgt gagacaaaaattatctatttgtatataatacataacagggtaaatt atttatgaactgcatgtataaatgaagtttatacagtacagtgg acatgTCCATGACCAGAAGGGAAAC
BDNFu2	GE1184	BDNF	T	G	I	R	cds	AAGCCCTAACCAGTTTTCTG	GTTTCCCTTCT GGTCATGGA	1000 AAGCCCTAACCAGTTTTCTGtcttgtttctgctttctccctacag gatgaccatccttttcctactatggttattttcatacttttggttg aagaagcaaacatccgaggacaaggtggcttggcctacccaggtg gagagcgtgaatgggcccaaggcaggttcaagaggctgacatca cgtgatagaagagctgttggatgaggaccagaaagttcggcccaa cagacttgtacacgtccagggtgatgctcagtagtcaagtgcctt ctgctggaggaatacaaaaattacctagatgctgcaaacatgtcc tgaccctgcccgccgaggggagctgagcgtgtgtgacagtattag acaaaaagactgcagtggacatgtcgggcgggacggtcacagtcc aaaggccaactgaagcaatacttctacgagaccaagtgcaatccc ctgcagggcatagacaaaaggcattggaactcccagtgccgaac ccctaccatggatagcaaaaagagaattggctggcgattcataa tgtatgtacattgaccattaaaagggaagatagtggatttatgt gagacaaaaattatctatttgtatataatacataacagggtaaatt atttatgaactgcatgtataaatgaagtttatacagtacagtgg acatgTCCATGACCAGAAGGGAAAC

FIG. 5H

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
BDNFu3	BDNF	A	G	K	R	cds	GE1184	AAGCCCTAACC AGTTTTCTG	GTTTCCCTTCT GGTCATGGA	AAGCCCTAACCAGTTTTCTGtcttgtttctgctttctccctacagttccaccaggtgagaagagt gatgaccatccttttccttactatggttatttcatactttggttgcatga[a/g]ggctgccccc atgaaagaagcaaacatccgaggacaaggtggcttggcctacccaggtgtgcggacccatgggac tctggagagcgtgaatgggcccaaggcaggttcaagaggcttgacatcattggctgacactttcg aacacgtgatagaagagctgttggatgaggaccagaaagttcggcccaatgaagaaaacaataag gacgcagacttgtacacgtccagggtgatgctcagtagtcaagtgcctttggagcctcctcttct ctttctgctggaggaatacaaaaattacctagatgctgcaaacatgtccatgagggtccggcgcc actctgaccctgcccgccgaggggagctgagcgtgtgtgacagtattagtgagtgggtaacggcg gcagacaaaaagactgcagtggacatgtcgggcgggacggtcacagtccttgaaaaggtccctgt atcaaaaggccaactgaagcaatacttctacgagaccaagtgcaatcccatgggttacacaaaag aaggctgcaggggcatagacaaaaggcattggaactcccagtgccgaactacccagtcgtacgtg cgggcccttaccatggatagcaaaaagagaattggctggcgattcataaggatagacacttcttg tgtatgtacattgaccattaaaaggggaagatagtggatttatgttgtatagattagattatatt gagacaaaaattatctatttgtatatatacataacagggtaaattattcagttaagaaaaaaata attttatgaactgcatgtataaatgaagtttatacagtacagtggttctacaatctatttattgg acatgTCCATGACCAGAAGGGAAAC	1000
CD36d8	CD36	G	A	P	P	cds	GE459	TGTCTTAAACA GTGACTTTGTT TTTGT	TGCCATTCATA TTTGGTACT	TGTCTTAAACAGTGACTTTGTTTTTGTaggctgcatcccatatctatcaaaatcaatttgttcaa atgatcctcaattcacttattaacaagtcaaaatcttctatgttccaagtcagaactttgagaga actgttatggggctatagggatccatttttgagtttggttcc[g/a]taccctgttactaccaca gttggtctgttttatcctgtaAGTACCAAATATGAATGGCA	236
CD36u1	CD36	A	T	Q	L	cds	GE437	CTGCTGTTTCT TTAGAGTTCG	TGTTGTTTGTC TACTCACTGCC A	CTGCTGTTTCTTTAGAGTTCGttttctagccaaggaaaatgtaacccaggacgctgaggacaaca cagtctctttcctgc[a/t]gcccaatggtgccatcttcgaaccttcactatcagttggaacaga ggctgacaacttcacagttctcaatctggctgTGGCAGTGAGTAGACAAACAACA	185
CD36u2	CD36	T	G	V	V	cds	GE437	CTGCTGTTTCT TTAGAGTTCG	TGTTGTTTGTC TACTCACTGCC A	CTGCTGTTTCTTTAGAGTTCGttttctagccaaggaaaatgtaacccaggacgctgaggacaaca cagtctctttcctgcagcccaatggtgccatcttcgaaccttcactatcagttggaacagaggct gacaacttcacagt[t/g]ctcaatctggctgTGGCAGTGAGTAGACAAACAACA	185
CD36u3	CD36	G	T	V	F	cds	GE459	TGTCTTAAACA GTGACTTTGTT TTTGT	TGCCATTCATA TTTGGTACT	TGTCTTAAACAGTGACTTTGTTTTTGTaggctgcatcccatatctatcaaaatcaattt[g/t]t tcaaatgatcctcaattcacttattaacaagtcaaaatcttctatgttccaagtcagaactttga gagaactgttatggggctatagggatccatttttgagtttggttccgtaccctgttactaccaca gttggtctgttttatcctgtaAGTACCAAATATGAATGGCA	236
CD36u4	CD36	T	A	G	G	cds	GE437	CTGCTGTTTCT TTAGAGTTCG	TGTTGTTTGTC TACTCACTGCC A	CTGCTGTTTCTTTAGAGTTCGttttctagccaaggaaaatgtaacccaggacgctgaggacaaca cagtctctttcctgcagcccaatgg[t/a]gccatcttcgaaccttcactatcagttggaacaga ggctgacaacttcacagttctcaatctggctgTGGCAGTGAGTAGACAAACAACA	185
CD36u5	CD36	G	T	V	V	cds	GE476	TGGAATGCAGC TCTTTTT	ATGGACTGTGC TACTGAGG	TGGAATGCAGCTCTTTTTtctctgtatttaggtcaatctatgctgtatttgaatccgacgttaat ctgaaaggaatccctgt[g/t]atagatttgttcttccatccaaggcctttgcctctccagttg aaaacccagacaactattgtttctgcacagaaaaaattatctcaaaaaattgtacatcatatggt gtgctagacatcagcaaatgcaaagaaggtgagtaaataaCCTCAGTAGCACAGTCCAT	254
CD36u6	CD36	G	A	S	N	cds	GE426	TCCTAGGAATC TGTCCTATTG	CTGTGATGACC ACAAAACA	TCCTAGGAATCTGTCCTATTGgggaaa[g/a]tcactgcgacatgattaatggtacaggtaagaat attTGTTTTGTGGTCATCACAG	87
CD36u7	CD36	A	T	V	V	cds	GE440	ATCATTTGCCA CTCGATTT	GCATACTTATA CTTCAGTATCT GTCTTACC	ATCATTTGCCACTCGATTTtaaacagatgcagcctcatttccacctttgttgagaaaagccag gt[a/t]ttgcagttcttttcttctgatatttgcaGGTAAGACAGATACTGAAGTATAAGTATGC	130

FIG. 5I

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CGAu1	CGA	A	G	R	R	cds	GE529	TTTTTGCCATG TCTGTCTG	AAATGTGTGTT GTCCTTATTAC TT	TTTTTGCCATGTCTGTCTGcaggagcgccatggattactacag[a/g]aaatatgcagctatctt tctggtcacattgtcggtgtttctgcatgttctccattccgctcctgatgtgcagggtgcgtgac caaatttgtggttcAAGTAATAAGGACAACACACATTT	168
CNTFu1	CNTF	A	G	R	R	cds	GE1154	TTTAAGGACAC TGGGGTGAT	GGGAACTACGC ATATTCCATTA G	TTTAAGGACACTGGGGTGATgacagaagatgtggtgttttcctgtatcctcggccaggtgaagca tcagggcctgaacaagaacatcaacctggactctgcggatgggatgccagtggcaagcactgatc agtggagtgagctgaccgaggcagagcgactccaagagaaccttcaagcttatcgtaccttccat gttttgttggccaggctcttagaagaccagcaggtgcattttaccccaaccgaaggtgacttcca tcaagctatacataccctttcttctccaagtcgctgcctttgcataccagatagaggagttaatga tactcctggaatacaagatcccccgcaatgaggctgatgggatgcctatlaatgttggagatggt ggtctctttgagaagaagctgtgggcctaaaggtgctgcaggagctttcacagtggacagtaag gtccatccatgaccttcgtttcatttcttctc[a/g]tcagactgggatcccagcacgtgggagc cattatattgctaacaacaagaaaatgtagcagttagtcccttctctcttcctgctttctcttC TAATGGAATATGCGTAGTTCCC	607
CNTFu2	CNTF	C	G	A	G	cds	GE1080	TTTGGACCAGT ATAGACAGAAG	TGGTAAGTTGC TGGATCAAAAA	TTTGGACCAGTATAGACAGAAGtaaacccagctgacttgtttcctgggacagttgagttaaggga tggctttcacagagcattcaccgctgacccctcaccgtcgggacctctgtagccgctctatctgg ctag[c/g]aaggaagattcgttcagacctgactgctcttacggaatcctatgtaagttgcctat tttgctgttatctgaaaacccttcatctTTTTTGATCCAGCAACTTACCA	245
COMTu1	COMT	G	A	P	P	cds	GE1039	CCTGTCTGTGA GGACGTGG	GGGCTCACCTC CAAGAG	CCTGTCTGTGAGGACGTGGgcactgacaggcgctgttccaggtcacccttgtggttggagcgtcc caggacatcatcccccagctgaagaagaagtatgatgtggacacactggacatggtcttcctcga ccactggaaggaccggtacctgcc[g/a]gacacgcttCTCTTGGAGGTGAGCCC	185
COMTu2	COMT	G	A	-	-	noncoding	GE1151	AGAGGCACACA CCTGCT	GAACCCCAACC TTTCTTGT	AGAGGCACACACCTGCTctgtctacccgagggcaccagagggcacgagaaggctggctccctggc gctgacacgtcaggcaactgaggcacaaggctggcatttctgaaccttgcccctctgc[g/a]aa cacaaggggcgatggtggcactccaagcaaaggggcgtgtgggtgctgcaggaggagcacagag cactggcgcccctccctccccgccctgcagatgccggaggccccgcctctgctgttggcagctgt gttgctgggcctggtgctgctggtggtgctgctgctgcttctgaggcactggggctggggcctgt cccttatcggctggaacgagttcatcctgcagcccatccacaacctgctcatgggtgacaccaag gagcagcgcatcctgaaccacgtgctgcagcatgcggagcccgggaacgcacagagcgtgctgga ggccattgacacctactgcgagcagaaggagtgggccatgaacgtgggcgACAAGAAAGGTTGGG GTTC	524
COMTu3	COMT	C	T	H	H	cds	GE1151	AGAGGCACACA CCTGCT	GAACCCCAACC TTTCTTGT	AGAGGCACACACCTGCTctgtctacccgagggcaccagagggcacgagaaggctggctccctggc gctgacacgtcaggcaactgaggcacaaggctggcatttctgaaccttgcccctctgcgaacaca aggggcgatggtggcactccaagcaaaggggcgtgtgggtgctgcaggaggagcacagagcact ggcgcccctccctccccgccctgcagatgccggaggccccgcctctgctgttggcagctgtgttg ctgggcctggtgctgctggtggtgctgctgctgcttctgaggcactggggctggggcctgtccct tatcggctggaacgagttcatcctgcagcccatccacaacctgctcatgggtgacaccaaggagc agcgcatcctgaacca[c/t]gtgctgcagcatgcggagcccgggaacgcacagagcgtgctgga ggccattgacacctactgcgagcagaaggagtgggccatgaacgtgggcgACAAGAAAGGTTGGG GTTC	524

FIG. 5J

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
COMTu4	COMT	C	G	S	C	cds	GE1151	AGAGGCACACA CCTGCT	GAACCCCAACC TTTCTTGT	AGAGGCACACACCTGCTctgtctacccgagggcaccagagggcacgagaaggctggctccctggc gctgacacgtcaggcaactgaggcacaaggctggcatttctgaaccttgccccctctgcgaacaca aggggggcgatggtggcactccaagcaaaggggcgtgtgggtgctgcaggaggagcacagagcact ggcgcccctccctcccgcccctgcagatgccggaggccccgcctctgctgttggcagctgtgttg ctgggcctggtgctgctggtggtgctgctgctgcttctgaggcactggggctggggcctgt[c/g]ccttatcggctggaacgagttcatcctgcagcccatccacaacctgctcatgggtgacaccaag gagcagcgcatcctgaaccacgtgctgcagcatgcggagcccgggaacgcacagagcgtgctgga ggccattgacacctactgcgagcagaaggagtgggccatgaacgtgggcgACAAGAAAGGTTGGG GTTC	524
COMTu5	COMT	C	G	L	L	cds	GE1105	CACCTGTGCTC ACCTCTCC	GCCCTTTTTCC AGGTCTGA	CACCTGTGCTCACCTCTCCtccgtccccaacccctgccaggcaagatcgtggacgccgtgattca ggagcaccagccctccgtgctgctggagctgggggcctactgtggctactcagctgtgcgcatgg cccgcctgctgtcaccaggggcgaggct[c/g]atcaccatcgagatcaaccccgactgtgccgc catcacccagcggatggtggatttcgctggcatgaaggacaaggtgtgcatgcctgacccgttgT CAGACCTGGAAAAAGGGC	278
COMTu6	COMT	A	G	M	V	cds	GE1105	CACCTGTGCTC ACCTCTCC	GCCCTTTTTCC AGGTCTGA	CACCTGTGCTCACCTCTCCtccgtccccaacccctgccaggcaagatcgtggacgccgtgattca ggagcaccagccctccgtgctgctggagctgggggcctactgtggctactcagctgtgcgcatgg cccgcctgctgtcaccaggggcgaggctcatcaccatcgagatcaaccccgactgtgccgccatc acccagcggatggtggatttcgctggc[a/g]tgaaggacaaggtgtgcatgcctgacccgttgT CAGACCTGGAAAAAGGGC	278
CRHd1	CRH	A	G	-	-	noncoding	GE580	GAAGAGGGTCG ACACTATAAAA	ACGCAAAGTTG GTGGCGT	GAAGAGGGTCGACACTATAAAAtcccactccaggctctggagtggagaaactcagagaccaagtc cattgagagactgaggggaaagagaggagagaaagaaaaagagagtgggaacagtaaagagaaag gaagacaacctccagag[a/g]aagcccccggagacgtctctctgcagagaggcggcagcacccg gctcacctgcgaagcgcctgggaaggtagggagcgcctggacggaacACGCCACCAACTTTGCGT	260
CRHd2	CRH	C	G	-	-	noncoding	GE580	GAAGAGGGTCG ACACTATAAAA	ACGCAAAGTTG GTGGCGT	GAAGAGGGTCGACACTATAAAAtcccactccaggctctggagtggagaaactcagagaccaagtc cattgagagactgaggggaaagagaggagagaaagaaaaagagagtgggaacagtaaagagaaag gaagacaacctccagagaaagcc[c/g]ccggagacgtctctctgcagagaggcggcagcacccg gctcacctgcgaagcgcctgggaaggtagggagcgcctggacggaacACGCCACCAACTTTGCGT	260
CRHd3	CRH	G	A	-	-	noncoding	GE580	GAAGAGGGTCG ACACTATAAAA	ACGCAAAGTTG GTGGCGT	GAAGAGGGTCGACACTATAAAAtcccactccaggctctggagtggagaaactcagagaccaagtc cattgagagactgaggggaaagagaggagagaaagaaaaagagagtgggaacagtaaagagaaag gaagacaacctccagagaaagccccccggagacgtctctctgcagagaggcggcagcaccc[g/a] gctcacctgcgaagcgcctgggaaggtagggagcgcctggacggaacACGCCACCAACTTTGCGT	260
CYP11Ad5	CYP11A	C	T	N	N	cds	GE608	GGCCCCGTCAG AAATGG	GGGCTCCGAGG AGGAGA	GGCCCCGTCAGAAATGGctcctcagcctcttcctctccctgcagccatcactaa[c/t]gtcatt tttggggagcgccaggggatgctggaggaagtagtgaaccccgaggcccagcgattcattgatgc catctaccagatgttccacaccagcgtccccatgctcaaccttcccccagacctgttccgtctgt tcaggaccaagacctggaaggaccatgtggctgcatgggacgtgattttcagtaaaggtgagggc ttctctggctgtgcTCTCCTCCTCGGAGCCC	291
CYP11Au1	CYP11A	C	T	V	V	cds	GE564	GATCCTTCCAT CAGCCC	CACCACCTCCC TCCAGT	GATCCTTCCATCAGCCCctctcccccacccctccagggagaagctcggcaacgtggagtcggttt atgtcatcgaccctgaagatgtggcccttctctttaagtccgagggccccaacccagaacgattc ctcatcccgccctgggtcgcctatcaccagtattaccagagacccataggagt[c/t]ctgttga agtgagtcctgggccatctcccagggACTGGAGGGAGGTGGTG	238
CYP11Au2	CYP11A	T	C	V	A	cds	GE1323	TCCTCCCGCAG ACTTCAC	AGCCCTCTCTG ACTGGCA	TCCTCCCGCAGACTTCACcccatctccgtgaccctgcagagatatcttg[t/c]aaatgacttgg ttcttcgagattacatgattcctgccaaggtaggtgcagccagcaggctgcagctcTGCCAGTCA GAGAGGGCT	139

FIG. 5K

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11Au3	CYP11A	G	A	E	K	cds	GE585	CTGCAGGGAACCTCACTCTT	CACAGGGGGCAACAAGGT	CTGCAGGGAACCTCACTCTTttttctttcctccttccccacagctgacatatacacccagaacttctactgggaattgagacagaaaggaagtgttcaccacgattaccgtggcatcctctacagactccctgggagacagcaagatgtccttc[g/a]aggacatcaaggccaacgtcacagagatgctggcaggaggggtggacacggtgaggtggctgtaggggcggcACCTTGTTGCCCCCTGTG	248
CYP11Au4	CYP11A	T	A	L	Q	cds	GE556	CTACTCCCCACCAGACG	CCAGGGATTGGAGTTGGG	CTACTCCCCACCAGACGtccatgaccctgcagtggcacttgtatgagatggcacgcaacctgaaggtgcaggatatgctgcgggcagaggtcttggctgcgcggcaccaggcccagggagacatggccacgatgctacagctggtccccctcctcaaagccagcatcaaggagacac[t/a]aaggcaagcccacaaccacccatgccgccCCCAACTCCAATCCCTGG	229
CYP11B1a30	CYP11B1	A	T	N	I	cds	GE570	TCCCAGCACCAAAGTCTGAG	GGCATCACCCTCTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaatctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttga[a/t]tgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B1a31	CYP11B1	A	G	-	-	*noncoding*	GE577	GAATGGGCCTGAATGGC	CTCCAGGGTCTCTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccac[a/g]tgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B1a32	CYP11B1	A	T	-	-	*noncoding*	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccatttcaggtaaagccctccctggccc[a/t]cgctGGGAACACCCAGAGCCCT	285
CYP11B1a33	CYP11B1	C	T	-	-	*noncoding*	GE625	GGAGGCAGCCAGGAGGC	GTGTCCCTTCCCCATAGCAC	GGAGGCAGCCAGGAGGC[c/t]cggggctgccttgtgctcagcagtgcatcctccccgaagccagcaacttggctctttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggaccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B1d24	CYP11B1	G	C	-	-	noncoding	GE1231	GCAACTTTGAGGGTCTGAGAA	CCTGGGGTCAGGCAGAAA	GCAACTTTGAGGGTCTGAGAAggctgcaccacgtcgatgggctgcggaccaagccagatggaaacacc[g/c]gctgctgcaccaggtgctgaaacacctccaggtggagacactaacccaagaggacataaagatggtctacagcttcatattgaggcccagcatgttcccctcctcaccttcagagccatcaactaatcacgtctctgcacccagggtcccagcctggccaccagcctcccTTTCTGCCTGACCCCAGG	261
CYP11B1d25	CYP11B1	T	C	Y	Y	cds	GE570	TCCCAGCACCAAAGTCTGAG	GGCATCACCCTCTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaatcta[t/c]caggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B1d26	CYP11B1	C	G	N	K	cds	GE577	GAATGGGCCTGAATGGC	CTCCAGGGTCTCTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaa[c/g]gctgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccacatgggaagatcCAGCCTCAGAGACCCTGGAG	246

FIG. 5L

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B1d27	CYP11B1	C	A	-	-	noncoding	GE582	CTCCTGTGCAAGGTCTG	CTCCAGCAGGGGGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctncccttgctgcgtgcggccctcaaggagaccttg[c/a]ggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B1d28	CYP11B1	C	T	-	-	noncoding	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcactggaagtacaccagaccttccaggaactggggcccatttttcaggtaaagccctcc[c/t]tggccccacgctGGGAACACCCAGAGCCCT	285
CYP11B1d29	CYP11B1	C	T	-	-	noncoding	GE625	GGAGGCAGCCAGGAGGC	GTGTCCCTTCCCCATAGCAC	GGAGGCAGCCAGGAGGCc[c/t]ggggctgccttgtgctcagcagtgcatcctccccgaagccagcaacttggctctttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggaccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B1u1	CYP11B1	A	G	Q	R	cds	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgcccc[a/g]gcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccatttttcaggtaaagccctccctggccccacgctGGGAACACCCAGAGCCCT	285
CYP11B1u10	CYP11B1	C	G	P	A	cds	GE582	CTCCTGTGCAAGGTCTG	CTCCAGCAGGGGGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctn[c/g]cccttgctgcgtgcggccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B1u11	CYP11B1	T	G	-	-	noncoding	GE582	CTCCTGTGCAAGGTCTG	CTCCAGCAGGGGGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctncccttgctgcg[t/g]gcggccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B1u12	CYP11B1	C	T	L	L	cds	GE531	ACAGGAAGCCCCATCCA	AGGTTCTCAGCTCGAGGGGT	ACAGGAAGCCCCATCCAgctgaggacccttttctatggatgcccccacctccaggctctaccctgtgggtctgttt[c/t]tggagcgagtggtgagctcagacttggtgcttcagaactaccacatcccagctggggtgagtgagccccacACCCCTCGAGCTGAGAACCT	171
CYP11B1u13	CYP11B1	T	C	L	L	cds	GE618	CTCCCCAGTCATTCCCTGA	GCCCATGCTGCCCAGAC	CTCCCCAGTCATTCCCTGAtccccgctctgcaccgtccgcagacattggtgcgcgtgttcctctactctctgggtcgcaaccccgccttgttcccgaggcctgagcgctataaccccccagcgctggctagacatcaggggctccggcaggaacttctaccacgtgccctttggctttggcatgcgccagtgcct[t/c]gggcggcgcctggcagaggcagagatgctgctgctgctgcaccatgtgagcaggcccgggctggggagggcctgggcgggGTCTGGGCAGCATGGGC	297
CYP11B1u14	CYP11B1	G	A	C	Y	cds	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgt[g/a]catggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgcccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccatttttcaggtaaagccctccctggccccacgctGGGAACACCCAGAGCCCT	285

FIG. 5M

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 1u15	CYP11 B1	G	A	R	H	cds	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcaca ggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagc [g/a]tccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacct gcacctggaagtacaccagaccttccaggaactggggcccattttcaggtaaagccctccctggc ccacgctGGGAACACCCAGAGCCCT	285
CYP11B 1u16	CYP11 B1	C	T	D	D	cds	GE536	ATGGTCCCATT CCAGCAC	AGCAAGAACAC GCCACA	ATGGTCCCATTCCAGCACggcctcgtgcttggccccacaggtacga[c/t]ttgggaggagcagg catggtgtgtgtgatgctgccggaggacgtggagaagctgcaacaggtggacagcctgcatcccc acaggatgagcctggagccctgggtggcctacagacaacatcgtgggcacaaaTGTGGCGTGTTC TTGCT	200
CYP11B 1u17	CYP11 B1	G	A	L	L	cds	GE625	GGAGGCAGCCA GGAGGC	GTGTCCCTTCC CCATAGCAC	GGAGGCAGCCAGGAGGCccggggctgccttgtgctcagcagtgcatcctccccgaagccagcaac tt[g/a]gctcttttggagagcggctgggcctggttggccacagccccaagttctgccagcctg aacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggag cctgtctcgctggaccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttcc agtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B 1u18	CYP11 B1	C	T	-	-	noncoding	GE570	TCCCAGCACCA AAGTCTGAG	GGCATCACCCT CTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcc[c/t]gctccccggataggcgacaactgtatccag aaaatctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcct gttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcg tggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B 1u19	CYP11 B1	G	A	A	T	cds	GE582	CTCCTGTGCAA GGTCTG	CTCCAGCAGGG GGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaac gctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgcc[g/a]cagccagcatcagtgaacatccccagaaggcaaccaccgagctncccctttgctgcgtgcgg ccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGA G	261
CYP11B 1u2	CYP11 B1	A	G	E	E	cds	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcaca ggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagc gtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcac ctggaagtacaccagaccttccagga[a/g]ctggggcccattttcaggtaaagccctccctggc ccacgctGGGAACACCCAGAGCCCT	285
CYP11B 1u20	CYP11 B1	T	C	V	A	cds	GE531	ACAGGAAGCCC CATCCA	AGGTTCTCAGC TCGAGGGGT	ACAGGAAGCCCCATCCAgctgaggacccttctctatggatgcccccacctccaggctctaccctgt gggtctgtttctggagcgagtgg[t/c]gagctcagacttggtgcttcagaactaccacatccca gctggggtgagtgagccccacACCCCTCGAGCTGAGAACCT	171
CYP11B 1u21	CYP11 B1	C	G	R	R	cds	GE618	CTCCCCAGTCA TTCCCTGA	GCCCATGCTGC CCAGAC	CTCCCCAGTCATTCCCTGAtccccgctctgcaccgtccgcagacattggtgcgcgtgttcctcta ctctctgggtcgcaaccccgccttgttcccgaggcctgagcgctataacccccagcgctggctag acatcaggggctccggcaggaacttctaccacgtgccctttggctttggcatgcgccagtgcctt gggcggcg[c/g]ctggcagaggcagagatgctgctgctgctgcaccatgtgagcaggcccgggc tggggaggggcctgggcgggGTCTGGGCAGCATGGGC	297
CYP11B 1u22	CYP11 B1	A	T	T	S	cds	GE625	GGAGGCAGCCA GGAGGC	GTGTCCCTTCC CCATAGCAC	GGAGGCAGCCAGGAGGCccggggctgccttgtgctcagcagtgcatcctccccgaagccagcaac ttggctcttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaact tcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctg tctcgctgg[a/t]ccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttcc agtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307

FIG. 5N

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 1u23	CYP11 B1	C	G	-	-	noncoding	GE577	GAATGGGCCTG AATGGC	CTCCAGGGTCT CTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctg tgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaag gtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccat agaaggtgtgggcca[c/g]atgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B 1u3	CYP11 B1	G	A	L	L	cds	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcaca ggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagc gtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcac ctggaagtacaccagaccttccaggaact[g/a]gggcccattttcaggtaaagccctccctggc ccacgctGGGAACACCCAGAGCCCT	285
CYP11B 1u4	CYP11 B1	C	A	F	L	cds	GE577	GAATGGGCCTG AATGGC	CTCCAGGGTCT CTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctg tgcagaggttcctcccgatggtggatgcagtggccagggactt[c/a]tcccaggccctgaagaa gaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactaca ccatagaaggtgtgggccacatgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B 1u5	CYP11 B1	A	G	K	R	cds	GE577	GAATGGGCCTG AATGGC	CTCCAGGGTCT CTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctg tgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctga[a/g]gaa gaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactaca ccatagaaggtgtgggccacatgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B 1u6	CYP11 B1	C	T	T	I	cds	GE625	GGAGGCAGCCA GGAGGC	GTGTCCCTTCC CCATAGCAC	GGAGGCAGCCAGGAGGCccggggctgccttgtgctcagcagtgcatcctccccgaagccagcaac ttggctctttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaact tcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttccatgcccaggagcctg tctcgctgga[c/t]cagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttcc agtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B 1u7	CYP11 B1	G	A	A	A	cds	GE570	TCCCAGCACCA AAGTCTGAG	GGCATCACCCT CTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaa tctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggc[g/a]gagctcct gttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcg tggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B 1u8	CYP11 B1	G	A	-	-	noncoding	GE570	TCCCAGCACCA AAGTCTGAG	GGCATCACCCT CTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaa tctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttg aatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtgga cacggtcaggcc[g/a]gcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B 1u9	CYP11 B1	A	G	N	D	cds	GE582	CTCCTGTGCAA GGTCTG	CTCCAGCAGGG GGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaac gctctttgagctggctcggaacccc[a/g]acgtgcagcaggccctgcgccaggagagcctggcc gccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctnccccttgctgcgtgcgg ccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGA G	261
CYP11B 2d22	CYP11 B2	C	T	-	-	noncoding	GE1213	GAGGACTGAAG GGAGTGTG	CCACTGGGTGG TGGAGA	GAGGACTGAAGGGAGTGTGgggaggcagccaggaggcccggggctgccttgtgctcagcagtgca tcctccccgcagccagcaacttagctctttttggagagcggctgggcctggttggccacagcccc agttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcat gttcatgcccaggagcctgtctcgctggatcagccccaaggtgtggaaggagcactttgaggcct gggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggacaccat gggggcccaatttctcc[c/t]TCTCCACCACCCAGTGG	364

FIG. 50

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 2d23	CYP11 B2	G	A	-	-	*noncoding*	GE533	CATCCAGCTGA GGACCCTTT	ACTGGGGAGGG AGGTTCTC	CATCCAGCTGAGGACCCTTTct[g/a]tggatgcccccacctccaggctctaccctgtgggtctg ttttggagcgagtggtgagctcagacttggtgcttcagaactaccacatcccagctggggtgag tgagcccccacacccctcgagctGAGAACCTCCCTCCCCAGT	172
CYP11B 2d24	CYP11 B2	A	G	N	S	cds	GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	ATGCTTCCCAGCACCAAGATctgagggctgtcccctgctccctggacaggtgacaactgtatcca gaaaatctaccaggaactggccttca[a/g]ccgccctcaacactacacaggcatcgtggcagag ctcctgttgaaggcggaactgtcactagaagccatcaaggccaactctatggaactcactgcagg gagcgtggacacggtcaggccagcaaccagccccaCCCAGAGAGGGTGATGCC	248
CYP11B 2d25	CYP11 B2	A	C	R	R	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatggcttctgtagacagcgtttcccttgctga tgacgctctttgagctggctcggaaccccgacgtgcagcagatcctgcgccaggagagcctggcc gccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctgcccttgctgcgggcggc cctcaaggagaccttg[a/c]ggtgggtgctggatgaggcctccctgtggccCTGGCCCCCTGCT GGAG	264
CYP11B 2d26	CYP11 B2	G	A	-	-	noncoding	GE610	CCTGTGTCTTG CTGGGG	CAGGGTCTCTG GGGCTG	CCTGTGTCTTGCTGGGGcggcctcacaagctctgccctggcctctgtaggaatgggcctgaatgg cgcttcaaccgattgcggctgaacccagatgtgctgtcgcccaaggccgtgcagaggttcctccc gatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgccc gggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccat gcgggaag[g/a]tcCAGCCCCAGAGACCCTG	292
CYP11B 2u1	CYP11 B2	A	G	K	R	cds	GE610	CCTGTGTCTTG CTGGGG	CAGGGTCTCTG GGGCTG	CCTGTGTCTTGCTGGGGcggcctcacaagctctgccctggcctctgtaggaatgggcctgaatgg cgcttcaaccgattgcggctgaacccagatgtgctgtcgcccaaggccgtgcagaggttcctccc gatggtggatgcagtggccagggacttctcccaggccctga[a/g]gaagaaggtgctgcagaac gcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtggg ccatgcgggaaggtcCAGCCCCAGAGACCCTG	292
CYP11B 2u10	CYP11 B2	G	T	R	R	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatggcttctgtagacagcgtttcccttgctga tgacgctctttgagctggctcggaaccccgacgtgcagcagatcctgcgccaggagagcctggcc gccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctgcccttgctgcg[g/t]g cggccctcaaggagaccttgaggtgggtgctggatgaggcctccctgtggccCTGGCCCCCTGCT GGAG	264
CYP11B 2u11	CYP11 B2	G	A	A	T	cds	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtggagggagcattggaatggcactcaggg caaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactgggcact agagcc[g/a]ctcgggcccctaggacggtgctgccgtttgaagccatgccccagcatccaggca acaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatg caccagaccttccaggagctggggcccatttttcaggtaaagccctccctggccctcgctGGGAAC ACCCAGATCCCT	337
CYP11B 2u12	CYP11 B2	G	A	P	P	cds	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtggagggagcattggaatggcactcaggg caaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactgggcact agagccgctcgggcccctaggacggtgctgcc[g/a]tttgaagccatgccccagcatccaggca acaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatg caccagaccttccaggagctggggcccatttttcaggtaaagccctccctggccctcgctGGGAAC ACCCAGATCCCT	337
CYP11B 2u13	CYP11 B2	A	G	A	A	cds	GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	ATGCTTCCCAGCACCAAGATctgagggctgtcccctgctccctggacaggtgacaactgtatcca gaaaatctaccaggaactggccttcaaccgccctcaacactacacaggcatcgtggc[a/g]gag ctcctgttgaaggcggaactgtcactagaagccatcaaggccaactctatggaactcactgcagg gagcgtggacacggtcaggccagcaaccagccccaCCCAGAGAGGGTGATGCC	248

FIG. 5P

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 2u14	CYP11 B2	T	C	V	A	cds	GE533	CATCCAGCTGA GGACCCTTT	ACTGGGGAGGG AGGTTCTC	CATCCAGCTGAGGACCCTTTctgtggatgcccccacctccaggctctaccctgtgggtctgtttt tggagcgagtgg[t/c]gagctcagacttggtgcttcagaactaccacatcccagctggggtgag tgagcccccacacccctcgagctGAGAACCTCCCTCCCCAGT	172
CYP11B 2u15	CYP11 B2	A	C	T	P	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacaccccctcgagctgagaacctccctccccagtcattccctg atccctgctctgcaccgtccgcag[a/c]cattggtacaggttttcctctactcgctgggtcgca atgccgccttgttcccgaggcctgagcggtataatccccagcgctggctagacatcaggggctcc ggcaggaacttccaccacgtgccctttggctttggcatgcgccagtgcctcgggcggcgcctggc agaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctggg cagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u16	CYP11 B2	T	A	L	Q	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacaccccctcgagctgagaacctccctccccagtcattccctg atccctgctctgcaccgtccgcagacattggtacaggttttcctctactcgctgggtcgcaatgc cgccttgttcccgaggcctgagcggtataatccccagcgctggc[t/a]agacatcaggggctcc ggcaggaacttccaccacgtgccctttggctttggcatgcgccagtgcctcgggcggcgcctggc agaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctggg cagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u17	CYP11 B2	G	A	V	M	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacaccccctcgagctgagaacctccctccccagtcattccctg atccctgctctgcaccgtccgcagacattggtacaggttttcctctactcgctgggtcgcaatgc cgccttgttcccgaggcctgagcggtataatccccagcgctggctagacatcaggggctccggca ggaacttccaccac[g/a]tgccctttggctttggcatgcgccagtgcctcgggcggcgcctggc agaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctggg cagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u18	CYP11 B2	G	A	-	-	noncoding	GE652	CATGGGCTACT GACCAGGC	CAGGCTGCAGG AGGGAA	CATGGGCTACTGACCAGGCcagatggaaacccagcctctgtcctaggtgctgaagcacttcctgg tggagacactaactcaagaggacataaagatggtctacagcttcatattgaggcctggcacgtcc ccctcctcactttcagagcgattaactagtcttgcatctgcacccagggtcccagcctggccac cagcttccctctgcctgaccccaggccacctgtcttctctcccac[g/a]tgcacagcttcctga gtcacccctctgtccagccagctcctgcacaaatggaactccccagggcctccaggactggggct tgccaggcttgtcaaatagcaaggccagggcacagctggagacgatcttgctggcagggcctggc cttgtccccagccccacctggcccctttctccagcaagcagtgccctctggacagcttgactctac tcctcccagcgctggctccaggctcctcatgaggccatgcaagggtgctgtgattttgtcccttg ccttcctgcctagtctcacatgtccctgtcccctctcgccctggccagggcctctgtgcagacagt gtcagagtcattaagcgggatcccagcatctcagagtccagtcaagTTCCCTCCTGCAGCCTG	648
CYP11B 2u19	CYP11 B2	G	C	-	-	noncoding	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtg[g/c]agggagcattggaatggcactc agggcaaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactggg cactagagccgctcgggcccctaggacggtgctgccgtttgaagccatgccccagcatccaggca acaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatg caccagaccttccaggagctggggcccatttcaggtaaagccctccctggccctcgctGGGAAC ACCCAGATCCCT	337
CYP11B 2u2	CYP11 B2	A	G	K	K	cds	GE1213	GAGGACTGAAG GGAGTGTG	CCACTGGGTGG TGGAGA	GAGGACTGAAGGGAGTGTGgggaggcagccaggaggcccggggctgccttgtgctcagcagtgca tcctccccgcagccagcaacttagctctttttggagagcggctgggcctggttggccacagcccc agttctgccagcctgaacttcctccatgccctggaggtcatgttcaa[a/g]tccaccgtccagc tcatgttcatgcccaggagcctgtctcgctggatcagccccaaggtgtggaaggagcactttgag gcctgggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggaca ccatgggggcccaatttctcccTCTCCACCACCCAGTGG	364

FIG. 5Q

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 2u20	CYP11 B2	G	C	L	L	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatg tgacgctctttgagctggctcggaacccgacgtgc gccgcagccagcatcagtgaacatccccagaaggca cggccctcaaggagaccttgaggtgggtgctggatg GGAG	264
CYP11B 2u21	CYP11 B2	A	C	S	R	cds	GE652	CATGGGCTACT GACCAGGC	CAGGCTGCAGG AGGGAA	CATGGGCTACTGACCAGGCcagatggaaacccagcc tggagacactaactcaagaggacataaagatggtct gtccccctcctcacttcagagcgattaactagtc ccaccagcttccctcctgccctgacccaggccacctg gtcacccctctgtccagccagctcctgcacaaatgg tgccaggcttgtcaaatagcaaggccagggcacagc ctttgtccccagccccacctggccctttctcccagcaa tcctccagcgctggctccaggctcctcatgaggcc ccttcctgcctagtctcacatgtccctgtccctctc gtcagagtcattaagcgggatcccagcatcttcagag	648
GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	C	A	A	cds	GE1213	GAGGACTGAAG GGAGTGTG	CCACTGGGTGG TGGAGA	GAGGACTGAAGGGAGTGTGgggaggccagcaggagg tcctccccgcagccagcaacttagctctttttgggag agttctgccagcctgaacttcctccatgccctggag gttcatgcccaggagcctgtctctcgctggatcagccc /g]tgggactgcatcttcccagtacggtgaggccagg ccatgggggcccaatttctccctCTCCACCACCCAG	364
GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	G	A	A	cds	GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	ATGCTTCCCAGCACCAAGATctgagggctgtcccct gaaaatctaccaggaactggccttcaaccgcccctca tgttgaaggc[g/a]gaactgtcactagaagccatc ggcgccgcagccagcatcagtgaacatccccagaa cggccctcaaggagaccttgaggtgggtgctggatg GGAG	248
GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	C	A	A	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatg tgacgctctttgagctggctcggaacccgacgtgc ggccgccgcagccagcatcagtgaacatccccagaa cggccctcaaggagaccttgaggtgggtgctggatg GGAG	264
GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	G	A	A	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGCccccacacccctcgagc atccctgctcctgcaccgtccgcagacattggtacag cgccttgttcccgaggcctgagcggtataaatcccca lgcaggaacttccaccacgtgcctgctgcaccactgg agaggcagagatgctgctgctgcaccactgg cagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u3	CYP11 B2	C	G	A	A	cds	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTgggctgaacaggg caaaggcagaggtgtgcgtggcagcgccctggctgt agagccgctc[g/a]ggcccctaggacggtgctgcc acaggtggctgaggctgctgcagatctggagggagc caccagaccttccaggagctgggcccatttcagg ACCCAGATCCCT	337
CYP11B 2u4	CYP11 B2	G	A	A	A	cds					
CYP11B 2u5	CYP11 B2	T	C	I	T	cds					
CYP11B 2u6	CYP11 B2	G	A	G	S	cds					
CYP11B 2u7	CYP11 B2	G	A	R	Q	cds					

FIG. 5R

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B2u8	CYP11B2	C	T	F	F	cds	GE610	CCTGTGTCTTGCTGGGG	CAGGGTCTCTGGGGCTG	CCTGTGTCTTGCTGGGGcggcctcacaagctctgccctggcctctgtaggaatgggcctgaatggcgcttcaaccgattgcggctgaacccagatgtgctgtcgcccaaggccgtgcagaggttcctcccgatggtggatgcagtggccagggactt[c/t]tcccaggccctgaagaagaaggtgctgcagaaccgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccatgcgggaaggtcCAGCCCCAGAGACCCTG	292
CYP11B2u9	CYP11B2	T	C	I	T	cds	GE1213	GAGGACTGAAGGGAGTGTG	CCACTGGGTGGTGGAGA	GAGGACTGAAGGGAGTGTGgggaggcagccaggaggcccggggctgccttgtgctcagcagtgcatcctccccgcagccagcaacttagctctttttggagagcggctgggcctggttggccacagccccagttctgccagcctgaactttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctgga[t/c]cagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggacaccatgggggcccaatttctcccTCTCCACCACCCAGTGG	364
CYP17u1	CYP17	C	T	H	H	cds	GE626	CTTCTACTCCACTGCTGTCTATC	GGGCACCACTTACCATT	CTTCTACTCCACTGCTGTCTATCttgcctgccggcacccagccaccatgtgggagctcgtggctctcttgctgcttaccctagcttatttgttttggcccaagagaaggtgccctggtgccaagtacccaaagagcctcctgtccctgcccctggtgggcagcctgccattcctccccagaca[c/t]ggccatatgcataacaacttcttcaagctgcagaaaaaatatggccccatctattcggttcgtatgggcaccaagactacagtgattgtcggccaccaccagctggccaaggaggtgcttattaagaagggcaaggacttctctgggcggcctcaAATGGTAAGTGGTGCCC	360
CYP17u2	CYP17	G	T	S	S	cds	GE626	CTTCTACTCCACTGCTGTCTATC	GGGCACCACTTACCATT	CTTCTACTCCACTGCTGTCTATCttgcctgccggcacccagccaccatgtgggagctcgtggctctcttgctgcttaccctagcttatttgttttggcccaagagaaggtgccctggtgccaagtacccaaagagcctcctgtccctgcccctggtgggcagcctgccattcctccccagacacggccatatgcataacaacttcttcaagctgcagaaaaaatatggccccatctattc[g/t]gttcgtatgggcaccaagactacagtgattgtcggccaccaccagctggccaaggaggtgcttattaagaagggcaaggacttctctgggcggcctcaAATGGTAAGTGGTGCCC	360
CYP17u3	CYP17	G	A	P	P	cds	GE641	CCTTGCCTGCAGAGCGT	GGGCCACATAGGGTGGA	CCTTGCCTGCAGAGCGTttcttgaatccagcggggacccagctcatctcacc[g/a]tcagtaagctatttgccccttcggagcaggacctcgctcctgtataggtgagatcctggcccgccaggagctcttcctcatcatggcctggctgctgcagaggttcgacctggaggtgccagatgatgggcagctgccctccctggaaggcatccccaaggtggtctttctgatcgactctttcaaagtgaagatcaaggtgcgccaggcctggagggaagcccaggctgagggtagcacctaaaggctgtaactcacagcccctgTCCACCCTATGTGGCCC	339
CYP17u4	CYP17	T	A	L	Q	cds	GE626	CTTCTACTCCACTGCTGTCTATC	GGGCACCACTTACCATT	CTTCTACTCCACTGCTGTCTATCttgcctgccggcacccagccaccatgtgggagctcgtggctctcttgctgcttaccctagcttatttgttttggcccaagagaaggtgccctggtgccaagtacccaaagagcctcctgtccctgcccctggtgggcagcctgccattcctccccagacacggccatatgcataacaacttcttcaagctgcagaaaaaatatggccccatctattcggttcgtatgggcaccaagactacagtgattgtcggccaccaccagc[t/a]ggccaaggaggtgcttattaagaagggcaaggacttctctgggcggcctcaAATGGTAAGTGGTGCCC	360
CYP17u5	CYP17	C	T	S	F	cds	GE520	TCTCTAAAGGCAACTCTAGACATC	CTGGCACTCACTGATCTTC	TCTCTAAAGGCAACTCTAGACATCgcgtccaacaaccgtaagggtatcgccttcgctgact[c/t]tggcgcacactggcagctgcatcgaaggctggcgatggccacctttgccctgttcaaggatggcgatcagaagctggaGAAGATCAGTGAGTGCCAG	163
CYP17u6	CYP17	G	A	G	D	cds	GE520	TCTCTAAAGGCAACTCTAGACATC	CTGGCACTCACTGATCTTC	TCTCTAAAGGCAACTCTAGACATCgcgtccaacaaccgtaagggtatcgccttcgctgactctg[g/a]cgcacactggcagctgcatcgaaggctggcgatggccacctttgccctgttcaaggatggcgatcagaagctggaGAAGATCAGTGAGTGCCAG	163

FIG. 5S

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP17u 7	CYP17	C	A	T	N	cds	GE579	TCACCCAACCC AGGAGA	GGGGGAAGCAC ACCTGA	TCACCCAACCCAGGAGAaattccggagtgactctatcaccaacatgctggacacactgatgcaag ccaagatgaactcagataatggcaatgctggcccagatcaagactcagagctgctttcagataac cacattctcaccaccataggggacatctttggggctggcgtggagaccacca[c/a]ctctgtgg ttaaatggaccctggccttcctgctgcacaatccTCAGGTGTGCTTCCCCC	246
CYP17u 8	CYP17	T	A	S	T	cds	GE579	TCACCCAACCC AGGAGA	GGGGGAAGCAC ACCTGA	TCACCCAACCCAGGAGAaattccggagtgactctatcaccaacatgctggacacactgatgcaag ccaagatgaactcagataatggcaatgctggcccagatcaagactcagagctgctttcagataac cacattctcaccaccataggggacatctttggggctggcgtggagaccaccacc[t/a]ctgtgg ttaaatggaccctggccttcctgctgcacaatccTCAGGTGTGCTTCCCCC	246
CYP21d 20	CYP21	C	T	Q	*	cds	GE1218	GAGCGGCTGGA GGCTGG	GCTGGAGTTAG AGGCTGGC	GAGCGGCTGGAGGCTGGgcagctgtgggctgctggggcaggactccacccgatcattccccagat tcagcagcgactg[c/t]aggaggagctagaccacgaactgggccctggtgcctccagctcccgg gtcccctacaaggaccgtgcacggctgcccttgctcaatgccaccatcgccgaggtgctgcgcct gcggcccgttgtgccttagccttgccccaccgcaccacacggcccagcaggtgactcnccgagg gttggggatgagtgaggaaagcccgagcccagggaggtcctgGCCAGCCTCTAACTCCAGC	321
CYP21d 21	CYP21	G	A	-	-	noncoding	GE1218	GAGCGGCTGGA GGCTGG	GCTGGAGTTAG AGGCTGGC	GAGCGGCTGGAGGCTGGgcagctgtgggctgctggggcaggactccacccgatcattccccagat tcagcagcgactgcaggaggagctagaccacgaactgggccctggtgcctccagctcccgggtcc cctacaaggaccgtgcacggctgcccttgctcaatgccaccatcgccgaggtgctgcgcctgcgg cccgttgtgccttagccttgccccaccgcaccacacggcccagcaggtgactcnccgagggttg gggatgagtgaggaaagcccgagcccagggag[g/a]tcctgGCCAGCCTCTAACTCCAGC	321
CYP21d 22	CYP21	G	A	-	-	noncoding	GE1227	CTCAGGCCCAC CCCCAG	CAGGAAGCATG AGAATGCAG	CTCAGGCCCACCCCCAGcccctccctgagcctctccttgtcctgaactgaaagtactccctcctt ttctggcaggacgacaacttaatgcctgcctattacaaatgtatccaggaggtgttaaaaacctg gagccactggtccatccaaattgtggacgtgattccctttctcagggtgaggacctggagcctag acacccctgg[g/a]ttgaggggagaggctggggtggagggagaggctccttcccacagCTGCA TTCTCATGCTTCCTG	275
CYP21d 23	CYP21	A	G	-	-	noncoding	GE1227	CTCAGGCCCAC CCCCAG	CAGGAAGCATG AGAATGCAG	CTCAGGCCCACCCCCAGcccctccctgagcctctccttgtcctgaactgaaagtactccctcctt ttctggcaggacgacaacttaatgcctgcctattacaaatgtatccaggaggtgttaaaaacctg gagccactggtccatccaaattgtggacgtgattccctttctcagggtgaggacctggagcctag acacccctgggttgt[a/g]ggggagaggctggggtggagggagaggctccttcccacagCTGCA TTCTCATGCTTCCTG	275
CYP21d 24	CYP21	G	A	-	-	noncoding	GE544	CCGAGCCCAGG GAGGTC	AGCCTCCACCA CATTTT	CCGAGCCCAGGGAGGTCctggccagcctctaactccagccccctcagcatctccggctacgaca tccctgagggcacagtcatcattccgaacctccaaggcgcccacctggatgagacggtctgggag aggccacatgagttctggcctggtatgtgggggccgggggcctgcc[g/a]tgAAAATGTGGTG GAGGCT	201
CYP21d 25	CYP21	T	C	-	-	noncoding	GE546	AGGGTCCTCTC TCCGCTG	AGCATAGCAAG AACCCATCTC	AGGGTCCTCTCTCCGCTGacgctgctttggctgtctcccagatgtggtggtgctgaactccaaga ggaccattgaggaagccatggtcaaaaagtgggcagactttgctggcagacctgagccacttacc tgtaagggc[t/c]gggggcatttttttctttcttaaaaaaattttttttttaaGAGATGGGTTCTT GCTATGCT	203
CYP21d 26	CYP21	A	C	-	-	noncoding	GE546	AGGGTCCTCTC TCCGCTG	AGCATAGCAAG AACCCATCTC	AGGGTCCTCTCTCCGCTGacgctgctttggctgtctcccagatgtggtggtgctgaactccaaga ggaccattgaggaagccatggtcaaaaagtgggcagactttgctggcagacctgagccacttacc tgtaagggctgggggcatttttttctttcttaaa[a/c]aaattttttttttaaGAGATGGGTTCTT GCTATGCT	203

FIG. 5T

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP21d 27	CYP21	C	T	P	L	cds	GE612	CTCTTGAGCTA TAAGTGGCACC	CCTCCTATGGT GAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctg ctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcct ccacctcc[c/t]gcctcttgccccgggcttcttgcacttgctgcagcccgacctcccaatctat ctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagag gctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21d 28	CYP21	A	C	P	P	cds	GE612	CTCTTGAGCTA TAAGTGGCACC	CCTCCTATGGT GAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctg ctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcct ccacctcccgcctcttgccccgggcttcttgcacttgctgcagcccgacctccc[a/c]atctat ctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagag gctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21d 29	CYP21	C	T	-	-	noncoding	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcc[c/t]gctcctttcaccctctg caggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgca gccgagcatggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcac caccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 1	CYP21	T	C	L	L	cds	GE612	CTCTTGAGCTA TAAGTGGCACC	CCTCCTATGGT GAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctg ctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcct ccacctcccgcctcttgccccgggcttcttgcac[t/c]tgctgcagcccgacctcccaatctat ctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagag gctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21u 10	CYP21	C	T	P	L	cds	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcagg agagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagc[c /t]gagcatggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcac caccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 11	CYP21	C	T	S	S	cds	GE544	CCGAGCCCAGG GAGGTC	AGCCTCCACCA CATTTT	CCGAGCCCAGGGAGGTCctggccagcctctaactccagccccctttcagcatctc[c/t]ggctac gacatccctgagggcacagtcatcattccgaacctccaaggcgcccacctggatgagacggtctg ggagaggccacatgagttctggcctggtatgtgggggccgggggcctgccgtgAAAATGTGGTG GAGGCT	201
CYP21u 12	CYP21	C	G	H	Q	cds	GE544	CCGAGCCCAGG GAGGTC	AGCCTCCACCA CATTTT	CCGAGCCCAGGGAGGTCctggccagcctctaactccagccccctttcagcatctccggctacgaca tccctgagggcacagtcatcattccgaacctccaaggcgccca[c/g]ctggatgagacggtctg ggagaggccacatgagttctggcctggtatgtgggggccgggggcctgccgtgAAAATGTGGTG GAGGCT	201
CYP21u 13	CYP21	G	A	A	T	cds	GE612	CTCTTGAGCTA TAAGTGGCACC	CCTCCTATGGT GAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctg ctgctgctgctgcccctgctggctggc[g/a]cccgcctgctgtggaactggtggaagctccgga gcctccacctcccgcctcttgccccgggcttcttgcacttgctgcagcccgacctcccaatctat ctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagag gctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21u 14	CYP21	C	T	-	-	noncoding	GE612	CTCTTGAGCTA TAAGTGGCACC	CCTCCTATGGT GAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtct[c/t]gccatgctgctcctggg cctgctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccgga gcctccacctcccgcctcttgccccgggcttcttgcacttgctgcagcccgacctcccaatctat ctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagag gctgatctcgctctgGCCCTCACCATAGGAGG	292

FIG. 5U

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP21u 15	CYP21	G	T	V	L	cds	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcagg agagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccg agcatggaagagggctctggacagctcctggaagggcac[g/t]tgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcac caccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 16	CYP21	C	T	R	C	cds	GE1208	CTGGCCTGGTA TGTGGGG	AGGGGAGGGGT TCGTACAG	CTGGCCTGGTATGTGGGGggccgggggcctgccgtgaaaatgtggtggaggctggtccccgctgc cgctgaacgcctccccacccacctgtccacccgcccgcagatcgcttcctggagccaggcaagaa ctccagagctctggccttcggctgcggtgcccgcgtgtgcctgggcgagccgctggcg[c/t]gc ctggagctcttcgtggtgctgacccgactgctgcaggccttcacgctgctgccctccggggacgc cctgccctccctgcagcccctgccccactgcagtgtcatcctcaagatgcagcctttccaagtgc ggctgcagccccgggggatgggggcccacagcccgggccagaaccagtgatggggcaggaccgat gccagccgggtacctcagtttctcctttattgctcCTGTACGAACCCCTCCCCT	444
CYP21u 17	CYP21	T	G	V	G	cds	GE1208	CTGGCCTGGTA TGTGGGG	AGGGGAGGGGT TCGTACAG	CTGGCCTGGTATGTGGGGggccgggggcctgccgtgaaaatgtggtggaggctggtccccgctgc cgctgaacgcctccccacccacctgtccacccgcccgcagatcgcttcctggagccaggcaagaa ctccagagctctggccttcggctgcggtgcccgcgtgtgcctgggcgagccgctggcgcgcctgg agctcttcgtggtgctgacccgactgctgcaggccttcacgctgctgccctccggggacgccctg ccctccctgcagcccctgccccactgcagtgtcatcctcaagatgcagcctttccaag[t/g]gc ggctgcagccccgggggatgggggcccacagcccgggccagaaccagtgatggggcaggaccgat gccagccgggtacctcagtttctcctttattgctcCTGTACGAACCCCTCCCCT	444
CYP21u 18	CYP21	C	G	S	S	cds	GE576	CTTCATCAGTT CCCACCCTC	GGGGGCTACTG TGAGAGGC	CTTCATCAGTTCCCACCCTCcagccccacctcctcctgcagacaagctggtgtctaggaactac ccggacctgtc[c/g]ttgggagactactccctgctctggaaagcccacaagaagctcacccgct cagccctgctgctgggcatccgtgactccatggagccagtggtggagcagctgacccaggagttc tgtgaggtaaggctgggctcctgaggccacctcgggtcagccttGCCTCTCACAGTAGCCCCC	258
CYP21u 19	CYP21	G	T	G	C	cds	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcagg agagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccg agcatggaagag[g/t]gctctggacagctcctggaagggcacgtgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcac caccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 2	CYP21	G	C	S	T	cds	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcagg agagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccg a[g/c]catggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcac caccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 3	CYP21	T	C	S	S	cds	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcagg agagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccg agcatggaagagggctc[t/c]ggacagctcctggaagggcacgtgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcac caccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 4	CYP21	C	T	R	W	cds	GE1218	GAGCGGCTGGA GGCTGG	GCTGGAGTTAG AGGCTGGC	GAGCGGCTGGAGGCTGGgcagctgtgggctgctggggcaggactccacccgatcattccccagat tcagcagcgactgcaggaggagctagaccacgaactgggccctggtgcctccagctcccgggtcc cctacaaggaccgtgcacggctgcccttgctcaatgccaccatcgccgaggtgctgcgcctg[c/ t]ggcccgttgtgcccttagccttgccccaccgcaccacacggcccagcaggtgactcnccgagg gttggggatgagtgaggaaagcccgagcccagggaggtcctgGCCAGCCTCTAACTCCAGC	321

FIG. 5V

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP21u5	CYP21	A	G	N	S	cds	GE1208	CTGGCCTGGTA TGTGGGG	AGGGGAGGGGT TCGTACAG	CTGGCCTGGTATGTGGGGggccgggggcctgccgtgaaaatgtggtggaggctggtccccgctgc cgctgaacgcctccccacccacctgtccacccgcccgcagatcgcttcctggagccaggcaagaa ctccagagctctggccttcggctgcggtgcccgcgtgtgcctgggcgagccgctggcgcgcctgg agctcttcgtggtgctgacccgactgctgcaggccttcacgctgctgccctccggggacgccctg ccctccctgcagcccctgccccactgcagtgtcatcctcaagatgcagcctttccaagtgcggct gcagccccgggggatgggggcccacagcccgggccaga[a/g]ccagtgatggggcaggaccgat ggccagccgggtacctcagtttctcctttattgctcCTGTACGAACCCCTCCCCT	444
CYP21u6	CYP21	G	A	R	K	cds	GE576	CTTCATCAGTT CCCACCCTC	GGGGGCTACTG TGAGAGGC	CTTCATCAGTTCCCACCCTCcagcccccacctcctcctgcagacaagctggtgtcta[g/a]gaa ctacccggacctgtccttgggagactactccctgctctggaaagcccacaagaagctcacccgct cagccctgctgctgggcatccgtgactccatggagccagtggtggagcagctgacccaggagttc tgtgaggtaaggctgggctcctgaggccacctcgggtcagccttGCCTCTCACAGTAGCCCCC	258
CYP21u7	CYP21	T	A	I	N	cds	GE1225	CCACCTCGGGT CAGCCT	GCCAGAAAAGG AGGGAGTA	CCACCTCGGGTCAGCCTtgcctctcacagtagcccccgccctgcccgctgcacagcggcctgctg aactcacactgtttctccacagcgcatgagagcccagcccggcacccctgtggccattgaggagg aatttctctctcctcacctgcagcatca[t/a]ctgttacctcaccttcggagacaagatcaaggt gcctcacagcccctcaggcccacccccagcccctccctgagcctctccttgtcctgaactgaaag TACTCCCTCCTTTTCTGGC	279
CYP21u8	CYP21	T	A	M	K	cds	GE537	GAGAGGCTCCT TCCCACA	CTGTGGGCCGA GGGGAG	GAGAGGCTCCTTCCCACAgctgcattctcatgcttcctgccgcagttcttccccaatccaggtct ccggaggctgaagcaggccatagagaagagggatcacatcgtggaga[t/a]gcagctgaggcag cacaaggtggggactgtacgtggacggcCTCCCCTCGGCCCACAG	175
CYP21u9	CYP21	C	G	L	L	cds	GE629	TGTTGCCACTC TGTACTCCTCT C	GTTGCTGGGAA GGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcagg agagcct[c/g]gtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgca gccgagcatggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacc tcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggttttttgcttcac cacccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
DBHu1	DBH	G	T	A	S	cds	GE991	CCCACACAGGC ATTTTA	GCCGCCTACCT TCTATC	CCCACACAGGCATTTTActacccagaggaagccggcctt[g/t]ccttcgggggtccagggtcct ccagatatctccgcctggaagttcactaccacaacccactggtGATAGAAGGTAGGCGGC	125
DBHu2	DBH	C	T	R	C	cds	GE1034	CCCCACCAGGT TCAACA	GCAGCGCACCT GGAAGC	CCCCACCAGGTTCAACAacgaggatgtctgcacctgccctcaggcgtccgtgtctcagcagttca cctctgttccctggaactccttcaac[c/t]gcgacgtactgaaggccctgtacagcttcgcgcc catctccatgcactgcaacaagtcctcagccgtccGCTTCCAGGTGCGCTGC	182
DBHu3	DBH	G	C	G	A	cds	GE1294	CAGGTGGGACC AGAGAGC	GCAGTGTCCCC ATCGGT	CAGGTGGGACCAGAGAGCtcaccccagccatgcccgccctcagtcgctgggccagcctgcccggc cccagcatgcgggaggcagccttcatgtacagcacagcagtggccatcttcctggtcatcctggt ggccgcactgcagggctcggctccccgtgagagccccctcccctatcacatcccccctggacccgg aggggtccctggagctctcatggaatgtcagctacacccaggaggccatccatttccagctcctg gtgcggaggctcaaggctggcgtcctgtttg[g/c]gatgtccgaccgtggcgagcttgagaacg cagatctcgtggtgctctggACCGATGGGGACACTGC	362
DBHu4	DBH	T	C	V	A	cds	GE1034	CCCCACCAGGT TCAACA	GCAGCGCACCT GGAAGC	CCCCACCAGGTTCAACAacgaggatgtctgcacctgccctcaggcgtccgtgtctcagcagttca cctctg[t/c]tccctggaactccttcaaccgcgacgtactgaaggccctgtacagcttcgcgcc catctccatgcactgcaacaagtcctcagccgtccGCTTCCAGGTGCGCTGC	182
DBHu5	DBH	C	G	A	A	cds	GE1034	CCCCACCAGGT TCAACA	GCAGCGCACCT GGAAGC	CCCCACCAGGTTCAACAacgaggatgtctgcacctgccctcaggcgtccgtgtctcagcagttca cctctgttccctggaactccttcaaccgcgacgtactgaaggc[c/g]ctgtacagcttcgcgcc catctccatgcactgcaacaagtcctcagccgtccGCTTCCAGGTGCGCTGC	182
DBHu6	DBH	G	A	T	T	cds	GE966	TTTCCTCAGGG AGATGTG	CTTACCACTGT GGCCAGCTC	TTTCCTCAGGGAGATGTGctcatcacctcctgcacgtacaacac[g/a]gaagaccggGAGCTGG CCACAGTGGTAAG	78

FIG. 5W

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD1d11	DRD1	A	G	-	-	noncoding	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTT[a/g]ggaacttgaggggtgtcagagcccctgatgtgctttctct taggaagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggact tctctgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaac acgctggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgt catctccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc ttttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u1	DRD1	T	C	F	F	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctgagat tgctggcttctggccctttgggtccttctgtaacatctgggtggcctt[t/c]gacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u10	DRD1	G	C	G	R	cds	GE1170	GGATCTACAGG ATTGCTCAGAA AC	GCAATCTCCTC TAGCTTTTGG	GGATCTACAGGATTGCTCAGAAACaaatacggcgcattgcggccttggagagggcagcagtccac gccaagaattgccagaccaccacaggtaatggaaagcctgtcgaatgttctcaaccggaaagttc ttttaagatgtccttcaaaagagaaactaaagtcctgaagactctgtcggtgatcatgggtgtgt ttgtgtgctgttggctacctttcttcatcttgaactgcattttgcccttctgtgggtctggggag acgcagcccttctgcattgattccaacacctttgacgtgtttgtgtggtttgggtgggctaattc atccttgaaccccatcatttatgcctttaatgctgattttcggaaggcattttcaaccctcttag gatgctacagactttgccctgcgacgaataatgccatagagacggtgagtatcaataacaatggg gccgcgatgttttccagccatcatgagccacga[g/c]gctccatctccaaggagtgcaatctgg tttacctgatcccacatgctgtgggctcctctgaggacctgaaaaaggaggaggcagctggcatc gccagacccttggagaagctgtccccagccctatcggtcatattggactatgacactgacgtctc tctggagaagatccaacccatcacacaaaacggtcagcacccaacctgaactcgcagatgaatcc tgccacacatgctcatcCCAAAAGCTAGAGGAGATTGC	753

FIG. 5X

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD1u2	DRD1	C	T	Y	Y	cds	GE1170	GGATCTACAGGATTGCTCAGAAAC	GCAATCTCCTCTAGCTTTTGG	GGATCTACAGGATTGCTCAGAAACaaatacggcgcattgcggccttggagagggcagcagtccac gccaagaattgccagaccaccacaggtaatggaaagcctgtcgaatgttctcaaccggaaagttc ttttaagatgtccttcaaaagayaaactaaagtcctgaagactctgtcggtgatcatgggtgtgt ttgtgtgctgttggctacctttcttcatcttgaactgcattttgcccttctgtgggtctggggag acgcagcccttctgcattgattccaacacctttgacgtgtttgtgtggtttgggtgggctaattc atccttgaaccccatcatttatgcctttaatgctgattttcggaaggcattttcaaccctcttag gatgcta[c/t]agactttgccctgcgacgaataatgccatagagacggtgagtatcaataacaa tggggccgcgatgttttccagccatcatgagccacgaggctccatctccaaggagtgcaatctgg tttacctgatcccacatgctgtgggctcctctgaggacctgaaaaaggaggaggcagctggcatc gccagacccttggagaagctgtccccagccctatcggtcatattggactatgacactgacgtctc tctggagaagatccaacccatcacacaaaacggtcagcacccaacctgaactcgcagatgaatcc tgccacacatgctcatcCCAAAAGCTAGAGGAGATTGC	753
DRD1u3	DRD1	C	G	V	V	cds	GE1173	CTGACCCCTATTCCCTGCTT	CTCTCCAAGGCCGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggt[c/g]atgccctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u4	DRD1	C	T	P	S	cds	GE1173	CTGACCCCTATTCCCTGCTT	CTCTCCAAGGCCGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatg[c/t]cctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770

FIG. 5Y

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Reverse Primer (5' -> 3')	Forward Primer (5' -> 3')	#	Assay Sequence
DRD1u5	DRD1	A	C	A	A	cds	GE1173	CTCTCCAAGGC CGCAATG	CTGACCCCTAT TCCCTGCTT	770	CTGACCCCTATTCCCTGCTTaggaacttgag aagatgaggactctgaacacctctgccatgg tgttcgtatcctcactgcctgttttcctgtcg tggtctgtgctgccgttatcaggttccgaca tccttggctgtgtcagatctctttggtggccg tgctggcttctggccctttgggtcctctgt ctgc[a/c]tccatcctcaacctctgtgta ttccggtatgagaaagatgaccccaag tgtctgtactcatctccttcatcccagtgca tctgatggaaatgccacttcccctggctgaga atatgccatctcatccctgtaataagctttg ccaggatctacaggattgctgctcagaaacaat
DRD1u6	DRD1	A	G	K	E	cds	GE1170	GCAATCTCCTC TAGCTTTTGG	GGATCTACAGG ATTGCTCAGAA AC	753	GGATCTACAGGATTGCTCAGAAACaatacg gccaagaattgccagaccaccacaggtaatg ttttaagatgtccttcaaaagagaaactaaa ttgtgtgctgttggctacctttcttcatctt acgcagcccttctgcattgatccaacacct atccttgaacccccatcatttatgcctttaat gatgctacagactttgccctgcgacgaataa gccgcgatgttttccagccatcatgagccac cctgatcccacatgctgtgggctcctctgag gaccctggag[a/g]agctgtcccccagccc tctggagaagatccaacccatcacacaaaac tgccacacatgctcatcCCAAAAGCTAGAGG
DRD1u7	DRD1	A	C	R	R	cds	GE1173	CTCTCCAAGGC CGCAATG	CTGACCCCTAT TCCCTGCTT	770	CTGACCCCTATTCCCTGCTTaggaacttgag aagatgaggactctgaacacctctgccatgg tgttcgtatcctcactgcctgttttcctgtcg tggtctgtgctgccgttatcaggttccg[a/ catctccttggctgtgtcagatctctttggtg agattgctggcttctggcccttgggtcctt tccactgcatccatcctcaacctctgtga ttttccggtatgagaaagatgaccccaag tgtctgtactcatctccttcatcccagtgca tctgatggaaatgccacttcccctggctgaga atatgccatctcatccctgtaataagctttg ccaggatctacaggattgctgctcagaaacaat

FIG. 5Z

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Reverse Primer (5' -> 3')	Forward Primer (5' -> 3')	Assay Sequence
DRD1u8	DRD1	T	C	T	T	cds	GE1173	CTCTCCAAGGC CGCAATG	CTGACCCCTAT TCCCTGCTT	CTGACCCCTATTCCCTGCTTaggaacttg aagatgaggacttcgaacacctctgccat tgttcgtatccctcactgcctgtttccctgt tggtctgtgctgccgttatcaggttccga tccttggctgtgtcagatctcttgggtcctt ctgctggcttctggcccttgggtcctttct c(t/c)gcatccatcctcaacctctgtgt tttccggtatgagagaaagatgacccccca tgtctgtactcatctcctcatcccagtg tctgatggaaatgccacttccctgactaagct atatgccatctcatcctctgtaataagctt ccaggatctacaggattgctccagaaacaa
DRD1u9	DRD1	T	C	I	I	cds	GE1173	CTCTCCAAGGC CGCAATG	CTGACCCCTAT TCCCTGCTT	CTGACCCCTATTCCCTGCTTaggaacttg aagatgaggacttctgaacacctctgccat tgttcgtatccctcactgcctgtttccctgt tggtctgtgctgccgttatcaggttccga tccttggctgtgtcagatctcttgggtcctt tgctggcttctggcccttgggtcctttct ctgcatccatcctcaaccctctgtgatcc cggtatgagagaaagatgaccccaaggc tgtactcatctccttcatcccagtgcagc atggaaatgccacttcccctggctgagacc gccatcctcatcctctgtaataagctttta ccaggatctacaggattgctccagaaacaa
DRD2d10	DRD2	C	t	-	-	noncoding	GE1119	TCTTGGTAATG GTTAGGTGGG	AATTATGGCCG GTGGGC	AATTATGGCCGGTGGGCccgctgactccccg attgtcaccctgctg[g/c]tctacatca tcaacaccaaacgcagcagccgagctttcc caccccccaaccaactccaaggggtcCCCA
DRD2u1	DRD2	G	C	V	L	cds	GE1119	TCTTGGTAATG GTTAGGTGGG	AATTATGGCCG GTGGGC	AATTATGGCCGGTGGGCccgctgactcccc attgtcaccctgctg[g/c]tctacatca tcaacaccaaacgcagcagccgagctttcc caccccccaaccaactccaaggggtcCCCA
DRD2u2	DRD2	T	C	H	H	cds	GE1140	GGAATGGGACC TTTCACA	GCTGATGCCTG GGAACTT	GCTGATGCCTGGGAACTTgtcccggcttta ggcgagcccaggagctggagatggagatg agccccatcccacccagccaccaccagct acagcactcccgacagccccgccaaacca gccaagatctttgagatccagacccatgcc ccgtaggaagctctcccagcagaaggaga agtcggccctggctgctggccacagncgg

FIG. 5AA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD2u3	DRD2	A	G	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggcc[a/g]gc cagccntcacccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannncc ccggcaggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgcc agggcagtgctagtgagctgggcatggtaccagccctggggctggncccccccagctcaggggcag ctcatagagtccccccctcccacctccagtcccccctatccttggcaccaaagatgcagccgccttc cttgaccttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagttttc tctttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctcttcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774
DRD2u4	DRD2	C	T	P	P	cds	GE1140	GCTGATGCCTG GGAACTT	GGAATGGGACC TTTCACA	GCTGATGCCTGGGAACTTgtccggctttacccagagccctctgcctctggtgcaggaggctgccc ggcgagcccaggagctggagatggagatgctctccagcaccagcccacccgagaggacccggtac agccccatcccacccagccaccaccagctgactctccccgacccgtcccaccatggtctccacag cactcc[c/t]gacagccccgccaaaccagagaagaatgggcatgccaaagaccaccccaagatt gccaagatctttgagatccagaccatgcccaatggcaaaacccggacctccctcaagaccatgag ccgtaggaagctctcccagcagaaggagaagaaagccactcagatgctcgccattgttctcggtg agtcggccctggctgctggccacagncggtcTGTGAAAGGTCCCATTCC	439
DRD2u5	DRD2	G	T	-	-	noncoding	GE1165	CCACAGGAGGC AAGCAAG	GACTCGTCAAA GTTTTATTAGT TTGGT	CCACAGGAGGCAAGCAAGctctcttgccgaggagccaggcaacttcagtcctgggagacccatgt aaataccagactgcaggttggaccccagagattcccaagccaaaaaccttagctccctcccgcac cccgatgtggacctctactttccaggctagtccggacccacctcaccccgttacagctccccaag tggtttccacatgctctgagaagaggagccctcatcttgaagggcccaggagggtctatggggag aggaactccttggcctagcccaccct[g/t]ctgccttctgacggccctgcaatgtatcccttct cacagcacatgctggccagcctggggcctggcagggaggtcaggccctggaactctatctgggcc tgggctaggggacatcagaggttctttgagggactgcctctgccacactctgacgcaaaaccact ttccttttctattccttctggcctttcctctctcctgtttccctcccttccactgcctctgcct tagaggagcccacggctaagaggctgctgaaaaccatctggcctggcctggccctgccctgagga aggaggggaagctgcagcttgggagagcccctggggcctagactctgtaacatcactatccnatg cACCAAACTAATAAAACTTTGACGAGTC	678
DRD2u6	DRD2	G	C	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggccagccagc cntcacccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannncccccgg caggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgccagg[*g/c]cagtgctagtgagctgggcatggtaccagccctggggctggncccccccagctcaggggcag* ctcatagagtccccccctcccacctccagtcccccctatccttggcaccaaagatgcagccgccttc cttgaccttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagttttc tctttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctcttcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774

FIG. 5BB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD2u7	DRD2	C	G	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggccagccagc cntcaccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannnccccgg caggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgccaggg cagtgctagtgagctgggcatggtaccagccctggggctggnccccccagctcaggggcagctca tagagtccccctcccacctccagtccccctatccttggcaccaaagatgcagccgccttccttg accttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagttttct[c/ g]tttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctctcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774
DRD2u8	DRD2	G	A	L	L	cds	GE1088	GAGTGAGGGGT CCCTGG	CTTCGAGGGAG CAGGGG	GAGTGAGGGGTCCCTGGgcctgcaccccagattcagggtcccccgccctggcaggtacacagctg tggccatgcccatgct[g/a]tacaatacgcgctacagctccaagcgccgggtcaccgtcatgat ctccatcgtctgggtcctgtccttcaccatctcctgcccactcctcttcggactcaataacgcag gtacattctgcttttgtttgcctgaggctcagctggccctgggCCCCTGCTCCCTCGAAG	255
DRD2u9	DRD2	A	G	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggccagccagc cntcaccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannnccccgg caggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgccaggg cagtgct[a/g]gtgagctgggcatggtaccagccctggggctggnccccccagctcaggggcag ctcatagagtccccctcccacctccagtccccctatccttggcaccaaagatgcagccgccttc cttgaccttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagttttc tctttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctctcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774
DRD3u1	DRD3	A	G	S	G	cds	GE1135	CAAGCCCCAAA GAGTCTGAT	CGTCAACATGC ACCTGA	CAAGCCCCAAAGAGTCTGATtttattaatattgttttctgtctcctcacaggaagccccttggca tcacgcacctcctctgggctatggcatctctgagtcagctgagt[a/g]gccacctgaactacac ctgtggggcagagaactccacaggtgccagccaggcccgcccacatgcctactatgccctctcct actgcgcgctcatcctggccatcgtcttcggcaatggcctgctgtgcatggctgtgctgaaggag cgggccctgcagactaccaccaactacttagtagtgagcctggctgtggcagacttgctggtggc caccttggtgatgccctgggtggtatacctggaggtgagtagactTCAGGTGCATGTTGACG	387

FIG. 5CC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5d21	DRD5	C	T	H	H	cds	GE1174	GCCATCATGATCGTGACCTA	CTTGTCAGTGTCTGTGCGGT	GCCATCATGATCGTGACCTAcacgcgcatctaccgcatcgcccaggtgcagatccgcaggatttcctccctggagagggccgcagagcacgcgcagagctgccggagcagcgcagcctgcgcgcccgacaccagcctgcgcgcttccatcaagaaggagaccaaggttctcaagaccctgtcggtgatcatgggggtcttcgtgtgttgctggctgcccttcttcatccttaactgcatggtccctttctgcagtggacacccgaaggccctccggccggcttcccctgcgtcagtgagaccaccttcgacgtcttcgtctggttcggctgggctaactcctcactcaaccccgtcatctatgccttcaacgccgactttcagaaggtgtttgcccagctgctggggtgcagccactttctgctcccgcacgccggtggagacggtgaacatcagcaatgagctcatctcctacaaccaagacatcgtcttccacaaggaaatcgcagctgcctacatcca[c/t]atgatgcccaacgccgttacccccggcaaccgggaggtggacaacgacgaggaggagggtcctttcgatcgcatgttccagatctatcagacgtccccagatggtgaccctgttgctgagtctgtctgggagctggactgcgagggggagatttctttagacaaaataacacctttcaccccgaatggattccattaaactgcattaagaaaccccctcatggatctgcataACCGCACAGACACTGACAAG	778
DRD5u1	DRD5	C	T	N	N	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaa[c/t]gtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u10	DRD5	G	A	P	P	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtaccc[g/a]gggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5DD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u11	DRD5	C	G	Q	E	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccag[c/g]agctggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u12	DRD5	T	A	L	Q	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagc[t/a]ggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u13	DRD5	C	G	L	V	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa*cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc*tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtct[c/g]tggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggt*tactggccctttgga*gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5EE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	754
DRD5u114	DRD5	C	T	A	A	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACCgcgtacccggggcagttcgctcta cgccgtgggggctcggcgggggcaccgccactgggccctc tgaccctactcatcatcctggaccctgctgggcaacgtgctgg cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtct tcgtggcgctgctggtcatgccctggaaggcagtcgccgagg gcgttctgcgacgtctgggtggcttcgacatcatgtctcc cgtcatcagcgtggaccgctactgggccatcttccaggccctt agcgcatggccttggtcatggtcggcctggcatggaccttgt gtccagctcaactggcacagggaccaggcggcctcttgggc ggccaactggacgccctgggaggaggactttgggagcccga ccagcctgaatcgaacctacgccatctcttcctcgctcatca atgatcgtgacctacacgcgCATCTACCGCATCGCCCAG	754
DRD5u115	DRD5	T	G	L	R	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACCgcgtacccggggcagttcgctcta cgccgtgggggctcggcgggggcaccgccactgggccctc tgaccctactcatcatcctggaccctgctgggcaacgtgctgg cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtct tcgtggcgctgctggtcatgccctggaaggcagtcgccgagg gcgttctgcgacgtctgggtggccttcgacatcatgtctcc cgtcatcagcgtggaccgctactgggccatcttccaggccctt agcgcatggccttggtcatggtcggcctggcatggaccttgt gtccagctcaactggcacagggaccaggcggcctcttgggc ggccaactggacgccctgggaggaggactttgggagcccga ccagcctgaatcgaacctacgccatctcttcctcgctcatca atgatcgtgacctacacgcgCATCTACCGCATCGCCCAG	754
DRD5u116	DRD5	T	C	T	T	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACCgcgtacccggggcagttcgctcta cgccgtgggggctcggcgggggcaccgccactgggccctc tgaccctactcatcatcctggaccctgctgggcaacgtgctgg cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtct tcgtggcgctgctggtcatgccctggaaggcagtcgccgagg gcgttctgcgacgtctgggtggccttcgacatcatgtctcc cgtcatcagcgtggaccgctactgggccatcttccaggccctt agcgcatggccttggtcatggtcggcctggcatggaccttgt gtccagctcaactggcacagggaccaggcggcctcttgggc ggccaactggacgccctgggaggaggactttgggagcccga ccagcctgaatcgaacctacgccatctcttcctcgctcatca atgatcgtgacctacacgcgCATCTACCGCATCGCCCAG	

FIG. 5FF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
DRD5u17	DRD5	T	G	V	V	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	754 CCCGGGGCAGTTCGCTCTATACCAGCAGCTGGCGCAGGGGAA CACCGCCACTGGGGCCCTCACAGGTGGTCACCGCCTGCCTGC CTGCTGGYCAACGTGCTGGTGTGCGCAGCCATCGTGCGGAGC CAACGTCTTCATCGTGTCTCTGGCCGTGTCAGACCTTTCGT AGGCAGTCGCCGAGGTGGCCGGTTACTGGCCCTTGGAGCGT GACATCATGTGCTCCACTGCCTCCATCCTGAACCTGTGCGTC CATCTCCAGGCCCTTCCGCTACAAGCGCAAGATGACTCAGCG TGGCATGGACCTTGTCCATCCTCATCTCCTTCATTCCGGTCC GCGGCCTCTTGGGCGGGCTGGACCTGCCAAACAACCTGGCC CTTTGGGAGCCCGACGTGAATGCAGAGAACTGTGACTCCAG CTCCTCGCTCATCAGCTTCTACATCCCCGT[T/G]GCCATC CTACCGCATCGCCCAG
DRD5u18	DRD5	T	C	L	L	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	754 CCCGGGGCAGTTCGCTCTATACCAGCAGCTGGCGCAGGGGAA CACCGCCACTGGGGCCCTCACAGGTGGTCACCGCCTGCCTGC CTGCTGGGCAACGTGCTGGTGTGCGCAGCCATCGTGCGGAGC CAACGTCTTCATCGTGTCTCTGGCCGTGTCAGACCT[T/C]T TGGAAGGCAGTCGCCGAGGTGGCCGGTTACTGGCCCTTTGGA CTTCGACATCATGTGCTCCACTGCCTCCATCCTGAACCTGTG GGCCATCTCCAGGCCCTTCCGCTACAAGCGCAAGATGACTC GGCCTGGCATGGACCTTGTCCATCCTCATCTCCTTCATTCCG CCAGGCGGCCTCTTGGGCGGGCTGGACCTGCCAAACAACCT GTCCAGCTCAACTGGCACAGGGACCAGGCGGCCAACTGGAC GGCCAACTGGACGCCCTGGGAGGAGGAGAACTGTGACTCC CCAGCCTGAATCGAACCTACGCCATCTTCTACATCCCCGTTG CCATCATGTGCCGAGGTGGCCGGTTACTGGCCCTTGGAAGGC ATGATCGTGACCTACACGCGCATCTACCGCATCGCCCAG
DRD5u19	DRD5	G	A	G	E	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	754 CCAGGCAGCAACGGCACCgcgtacccgcagggcgaaggcgtt cgccgtgggggctcggcgcgggcaccgcgcgcgtgcgcgtcg tgaccctactcatcctggaccctgccgccgcgcgcgcgcgc cgccacctgcgcgccaacatgaccgccgccgccgccgccgc ggcgctgctggtcatgccctggaagcgcgcgcgcgcgcgc tctgcgacgtctgggtggccttcgacagcgcgcgcgcgcgc atcagcgtggaccgctactgggccatcgccgccgccgccgc catggccttggtcatggtcgcctggccgccgccgccgccgc agctcaactggcacagggaccaggcggccgccgccgccgc aactggacgccctgggaggaggaggacttcgccgccgccgc cctgaatcgaacctacgccatcttctacatccccgttgccat atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG

FIG. 5GG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u2	DRD5	G	C	C	S	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACCgcgtacccgggcagttcgctcta	754
										tgaccctatcatctggaccctgctgggcaaccgtgctgg	
										gagccgccacctgcgccaacatgaccaagtcttcatcgt	
										tcgtggcgctgctggtcatgccctggaaggcagtcgccgagg	
										gcgttctgcgacgtctgggtggccttcgacatcatgtgctcc	
										cgtcatcagcgtggaccgctactgggccatctccaggccctt	
										agcgcatggccttggtcatggtcggcctggcatggaccttgt	
										gtccagctcaactggcacagggaccaggcggcctcttgggc	
										ggccaactggacgccctgggaggaggactttgggagcccga	
										ccagcctgaatcgaacctacgccatctcttcctcgctcatca	
										atgatcgtgacctacacgcgCATCTACCGCATCGTCCCAG	
DRD5u2 0	DRD5	G	A	R	H	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACCgctacccgggcagttcgctcta	754
										cgccgtgggggctcggcgggcaccgccactgggccctc	
										tgaccctactcatctggaccctgctgggcaacgtgctgg	
										cgccacctgcgccaacatgaccaacgtcttcatcgtgtct	
										ggcgctgctggtcatgccctggaaggcagtcgccgaggtggc	
										tctgcgacgtctgggtggccttcgacatcatgtgctccactg	
										atcagcgtggaccgctactgggccatctccaggccctccgc	
										catggccttggtcatggtcggcctggcatggaccttgtccat	
										agctcaactggcacagggaccaggcggcctcttgggcgggc	
										aactggacgccctgggaggaggactttgggagcccgacgtg	
										cctgaatcgaacctacgccatctcttcctcgctcatcagctt	
										tcgtgacctacacgc[g/a]CATCTACCGCATCGTCCCAG	
DRD5u3	DRD5	C	G	N	K	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACCgctacccgggcagttcgctcta	754
										cgccgtgggggctcggcgggcaccgccactgggccctc	
										tgaccctactcatctggaccctgctgggcaacgtgctgg	
										cgccacctgcgccaacatgaccaacgtcttcatcgtgtct	
										tcgtggcgctgctggtcatgccctggaaggcagtcgccgagg	
										gcgttctgcgacgtctgggtggccttcgacatcatgtgctcc	
										cgtcatcagcgtggaccgctactgggccatctccaggccctt	
										agcgcatggccttggtcatggtcggcctggcatggaccttgt	
										gtccagctcaactggcacagggaccaggcggcctcttgggc	
										ggccaactggacgccctgggaggaggactttgggagcccga	
										ccagcctgaatcgaacctacgccatctcttcctcgctcatca	
										atgatcgtgacctacacgcgCATCTACCGCATCGTCCCAG	

FIG. 5HH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u4	DRD5	C	T	F	F	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggcctt[c/t]gacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u5	DRD5	C	A	A	A	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgc[c/a]tccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u6	DRD5	C	G	V	V	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgt[c/g]atcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5II

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u7	DRD5	C	G	D	E	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtc atcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcg catggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtcc agctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggcc aactggacgccctgggaggaggacttttgggagcccga[c/g]gtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u8	DRD5	G	C	E	D	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtc atcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcg catggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtcc agctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggcc aactggacgccctgggaggaggacttttgggagcccgacgtgaatgcaga[g/c]aactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u9	DRD5	C	T	P	P	cds	GE1174	GCCATCATGAT CGTGACCTA	CTTGTCAGTGT CTGTGCGGT	GCCATCATGATCGTGACCTAcacgcgcatctaccgcatcgcccaggtgcagatccgcaggatttc ctccctggagagggccgcagagcacgcgcagagctgccggagcagcgcagcctgcgcgcccgaca ccagcctgcgcgcttccatcaagaaggagaccaaggttctcaagaccctgtcggtgatcatgggg gtcttcgtgtgttgctggctgcccttcttcatccttaactgcatggtccctttctgcagtggaca ccc[c/t]gaaggccctccggccggcttcccctgcgtcagtgagaccaccttcgacgtcttcgtc tggttcggctgggctaactcctcactcaaccccgtcatctatgccttcaacgccgactttcagaa ggtgtttgcccagctgctggggtgcagccacttctgctcccgcacgccggtggagacggtgaaca tcagcaatgagctcatctcctacaaccaagacatcgtcttccacaaggaaatcgcagctgcctac atccacatgatgcccaacgccgttacccccggcaacccgggaggtggacaacgacgaggaggaggg tcctttcgatcgcatgttccagatctatcagacgtccccagatggtgaccctgttgctgagtctg tctgggagctggactgcgagggggagatttctttagacaaaataacacctttcaccccgaatgga ttccattaaactgcattaagaaaccccctcatggatctgcataACCGCACAGACACTGACAAG	778
F10a9	F10	A	G	-	-	noncoding	GE913	GAGCCTGGCTT CTGGCTA	CGTGCCTCCTA CCTGTG	GAGCCTGGCTTCTGGCTAtaaaccgcactgcaccatgagcttccccgtgacccgtgaggttgccc ttcaaggcaagtgtacctgtcgcctggctctggcccttgctcaacccaatggccgctttgtggc tgacaggcaagtggatgtagctggcacccttgggccagcccagcctccatttctccagctgtccc cagagcc[a/g]acgtgcctctcctttggcagtcacacggaagctctgcagcctggacaacgggg actgtgaccagttctgccacgaggaacagaactctgtggtgtgctcctgcgcccgcgggtacacc ctggctgacaacggcaaggcctgcattccCACAGGTAGGAGGCACG	371

FIG. 5JJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F10d8	F10	C	T	F	F	cds	GE942	GGTTTTCAGTC AGGCAACAC	CAGACAGTGAC GGTGCCC	GGTTTTCAGTCAGGCAACACnagtccacctggccagccacactgagcctgtcacgtctgtcacag gccctgctcatcaatgaggaaaacgagggtttctgtggtggaaccattctgagcgagttctacat cctaacggcagcccactgtctctaccaagccaagagatt[c/t]gaaggtgagggtaggtaagtg accaacagcccccagggccgtggtgggGGGCACCGTCACTGTCTG	240
F10u1	F10	C	T	T	T	cds	GE942	GGTTTTCAGTC AGGCAACAC	CAGACAGTGAC GGTGCCC	GGTTTTCAGTCAGGCAACACnagtccacctggccagccacactgagcctgtcacgtctgtcacag gccctgctcatcaatgaggaaaacgagggtttctgtggtggaac[c/t]attctgagcgagttct acatcctaacggcagcccactgtctctaccaagccaagagattcgaaggtgagggtaggtaagtg accaacagcccccagggccgtggtgggGGGCACCGTCACTGTCTG	240
F10u2	F10	A	T	E	V	cds	GE907	GTCCCCTGGCT GAGCTG	GTGGGATCTCA CTTTAATGG	GTCCCCTGGCTGAGCTGagcacagtcccactcgtctgtcccaggggaccggaacacggagcagga ggagggcggtgaggcggtgcacg[a/t]ggtggaggtggtcatcaagcacaaccggttcacaaag gagacctatgacttcgacatcgccgtgctccggctcaagacccccatcaccttccgcatgaacgt ggcgcctgcctgcctccccgagcgtgactgggccgagtccacgctgatgacgcagaagacgggga ttgtgagcggcttcgggcgcacccacgagaagggccggcagtccaccaggctcaagatgctggag gtgccctacgtggaccgcaacagctgcaagctgtccagcagcttcatcatcacccagaacatgtt ctgtgccggctacgacaccaagcaggaggatgcctgccaggggacagcgggggcccgcacgtca cccgcttcaaggacacctacttcgtgacaggcatcgtcagctggggagagggctgtgcccgtaag gggaagtacgggatctacaccaaggtcaccgccttcctcaagtggatcgacaggtccatgaaaac caggggcttgcccaaggccaagagccatgccccggaggtcataacgtcctctCCATTAAAGTGAG ATCCCAC	657
F10u3	F10	C	T	A	A	cds	GE907	GTCCCCTGGCT GAGCTG	GTGGGATCTCA CTTTAATGG	GTCCCCTGGCTGAGCTGagcacagtcccactcgtctgtcccaggggaccggaacacggagcagga ggagggcggtgaggcggtgcacgaggtggaggtggtcatcaagcacaaccggttcacaaaggaga cctatgacttcgacatcgccgtgctccggctcaagacccccatcaccttccgcatgaacgtggcg cctgcctgcctccccgagcgtgactgggccgagtccacgctgatgacgcagaagacggggattgt gagcggcttcgggcgcacccacgagaagggccggcagtccaccaggctcaagatgctggaggtgc cctacgtggaccgcaacagctgcaagctgtccagcagcttcatcatcacccagaacatgttctgt gc[c/t]ggctacgacaccaagcaggaggatgcctgccaggggacagcgggggcccgcacgtca cccgcttcaaggacacctacttcgtgacaggcatcgtcagctggggagagggctgtgcccgtaag gggaagtacgggatctacaccaaggtcaccgccttcctcaagtggatcgacaggtccatgaaaac caggggcttgcccaaggccaagagccatgccccggaggtcataacgtcctctCCATTAAAGTGAG ATCCCAC	657
F10u4	F10	G	C	Q	H	cds	GE250	CCTGCCTTCCA GTGTTCAT	CCCAGCCCTTA CCGTCTTG	CCTGCCTTCCAGTGTTCATccgcagggagca[g/c]gccaacaacatcctggcgagggtcacgag ggccaattcctttcttgaagagatgaagaaaggacacctcgaaagagagtgcatggaagagacct gctcatacgaagaggcccgcgaggtctttgaggacagcgaCAAGACGGTAAGGGCTGGG	189
F10u5	F10	C	T	N	N	cds	GE913	GAGCCTGGCTT CTGGCTA	CGTGCCTCCTA CCTGTG	GAGCCTGGCTTCTGGCTAtaaaccgcactgcaccatgagcttccccgtgacccgtgaggttgccc ttcaaggcaagtgtacctgtcgcctggctctggccctttgctcaacccaatggccgctttgtggc tgacaggcaagtggatgtagctggcacccttgggccagcccagcctccatttctccagctgtccc cagagccaacgtgcctctcctttggcagtcacacggaagctctgcagcctggacaa[c/t]gggg actgtgaccagttctgccacgaggaacagaactctgtggtgtgctcctgcgcccgcgggtacacc ctggctgacaacggcaaggcctgcattccCACAGGTAGGAGGCACG	371
F10u6	F10	C	A	L	I	cds	GE242	AGCCAGACAAC AGCCATCC	GCGAGGGGCAC TTACGACT	AGCCAGACAACAGCCATCCcagctggggcgtggactttgctccagcagcctgtcccagtgaggac agggacacagtactcggccacaccatggggcgcccactgcac[c/a]tcgtcctgctcagtgcct ccctggctggcctcctgctgctcggggaaAGTCGTAAGTGCCCCTCGC	178

FIG. 5KK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F10u7	F10	A	T	Q	L	cds	GE913	GAGCCTGGCTT CTGGCTA	CGTGCCTCCTA CCTGTG	GAGCCTGGCTTCTGGCTAtaaaccgcactgcaccatgagcttccccgtgacccgtgaggttgccc ttcaaggcaagtgtacctgtcgcctggctctggccctttgctcaacccaatggccgctttgtggc tgacaggcaagtggatgtagctggcacccttgggccagcccagcctccatttctccagctgtccc cagagccaacgtgcctctcctttggcagtcacacggaagctctgcagcctggacaacggggactg tgacc[a/t]gttctgccacgaggaacagaactctgtggtgtgctcctgcgcccgcgggtacacc ctggctgacaacggcaaggcctgcattccCACAGGTAGGAGGCACG	371
F11d17	F11	G	C	C	S	cds	GE255	TGTGCTGACTT TTAAGATCCAT T	CAGCTGGTATT TGTTGATTCTG	TGTGCTGACTTTTAAGATCCATtattttaaaaacataaattcctattcattaatatgtatttttt aaaaaaacaggtttacttgtgtcctgaaagacagtgttacagaaacactgccaagagtgaatagg acagcagcgatttctgggtattctttcaagcaat[g/c]ctcacaccaaataagcggtaagatat gttctCAGAATCAACAAATACCAGCTG	222
F11d18	F11	C	T	I	I	cds	GE287	TGACTTTACTT TCTCTAGGTGC TG	ACCCTCCCTCA GCATGTATC	TGACTTTACTTTCTCTAGGTGCTGtaaaaatgtttttatgtgtttgatatgatatatttctactt ccctttgtttttgttagaaatctttgtctccttaaaacatctgagagtggattgcccagtacac gcattaaaaagagcaaagctctttctggtttcagtctacaaagctgcaggcacagcat[c/t]cc aggtaaactgagagttctgcattctggctgagagtgaccagccccgaggaggctGATACATGCTG AGGGAGGGT	269
F11d19	F11	G	C	-	-	noncoding	GE319	GCCCCTAGAAT CTGGAAGG	GCATAAAGTTG ATGGCAAAAG	GCCCCTAGAATCTGGAAGGtactcatgtcttctgcttttatttccagcttgcaacaaagacattt atgtggacctagacatgaagggcataaactataacagctcagttgccaagagtgctcaagaatgc caagaaagatgcacggatgacgtccactgccacttttcacgtacgccacaaggcagtttcccag cctggagcatcggtgagtgagtcccaggacattc[g/c]agtggtcgatgaaaaacagaatcgtg atttactaaaaagCTTTTGCCATCAACTTTATGC	294
F11d20	F11	G	C	G	R	cds	GE352	TGAGCAAGATG TGCTGAAGAT	AGCATGCTGGC ACAGTGAA	TGAGCAAGATGTGCTGAAGATgggaagcgtctgagttgatctgtgcacctttcttgtctccccct cgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggc atcacgagctggggcgaaggctgtgctcaaagggagcggccagg[g/c]gtgttacaccaacgtgg tcgagtacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattg gagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11d21	F11	A	G	-	-	noncoding	GE352	TGAGCAAGATG TGCTGAAGAT	AGCATGCTGGC ACAGTGAA	TGAGCAAGATGTGCTGAAGATggga[a/g]gcgtctgagttgatctgtgcacctttcttgtctc ccctcgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggt aggcatcacgagctggggcgaaggctgtgctcaaagggagcggccaggtgtttacaccaacgtgg tcgagtacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattg gagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11d22	F11	G	T	C	F	cds	GE356	TTCTGGCTGAG AGTGACCAG	GAAACAAAACG GTATAAACATA ATGC	TTCTGGCTGAGAGTGACCAGccccgaggaggctgatacatgctgagggagggtctcactctgaca tgtggtctgctgtctagtgttctgccattcttcattttaccatgacactgatttcttgggagaag aactggatattgttgctgcaaaaagtcacgaggcctgccagaaactgtgcaccaatgccgtccgc ttgccagtttttacctataccccagcccaagcatcct[g/t]caacgaagggaagtaagccatat gaagggttatgcagacacccttgtcccgtctgcctgtgaggtGCATTATGTTTATACCGTTTTGT TTC	328
F11u1	F11	C	T	P	L	cds	GE324	CCTTTATGAGA TTACCACCTAA CTAGA	TTTAAAAATCT GTCTCCTCGAT GT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgt actacatcacagaatgtgtgactcagttgttgaaggacacctgctttgaaggaggggacattact acggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtttact cttcactttcacggcggaatcac[c/t]atctgaggatcccacccgatggtaaatgcttatgttt ctACATCGAGGAGACAGATTTTTAAA	286

FIG. 5LL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F11u10	F11	A	G	Q	R	cds	GE928	CCTGATAGCTG GTGAATTG	TGGATTTTGAT CAGCTATTTTT A	CCTGATAGCTGGTGAATTGagtccctgacatagttcttccgtcgcgcagcttgtattagggacat tttccctaatacggtgtttgcagacagcaacatcgacagtgtcatggctcccgatgcttttgtct gtggccgaatctgcactcatcatcccggttgcttgtttttaccttcttttccc[a/g]ggaatg gcccaaagaatctcaaaggtaaggagttaacaagtaaggataatttgttatcttcTAAAAATAGC TGATCAAAATCCA	273
F11u11	F11	T	C	G	G	cds	GE916	TGGAAAGGAAG ATGTAGGAAGC	GCAAATAAGAC AATCTAATTGG TTAAAGTA	TGGAAAGGAAGATGTAGGAAGCtgctcatcacaatgcttctgttgcagagtgtaccaccaaaatc aagcccaggatcgttggaggaactgcgtctgttcgtgg[t/c]gagtggccgtggcaggtgaccc tgcacacaacctcacccactcagagacacctgtgtggaggctccatcattggaaaccagtggata ttaacagccgctcactgtttctatgggtcagtaccacggctgtttttattagttcatcttcttca cacatttataaaaaatattactagcatgttaggaaataaaTACTTTAACCAATTAGATTGTCTTA TTTGC	330
F11u12	F11	G	T	R	R	cds	GE352	TGAGCAAGATG TGCTGAAGAT	AGCATGCTGGC ACAGTGAA	TGAGCAAGATGTGCTGAAGATgggaagcgtctgagttgatctgtgcacctttttcttgtctcccct cgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggc atcacgagctggggcgaaggctgtgctcaaagggagcg[g/t]ccaggtgtttacaccaacgtgg tcgagtacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattg gagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11u13	F11	T	C	V	A	cds	GE324	CCTTTATGAGA TTACCACCTAA CTAGA	TTTAAAAATCT GTCTCCTCGAT GT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgt actacatcacagaatgtg[t/c]gactcagttgttgaaggacacctgctttgaaggaggggacat tactacggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtt tactcttcactttcacggcggaatcaccatctgaggatcccacccgatggtaaatgcttatgttt ctACATCGAGGAGACAGATTTTTAAA	286
F11u14	F11	A	C	N	H	cds	GE321	CTCTCTCCAAA GGGGACTTTC	TGAGCATAAGC TGGTATCCTGA G	CTCTCTCCAAAGGGGACTTTCttaatatctcatgtttttcctccttgcagttggaagaataaga cactttcctttttctttttattcagtaacatttgtctactgaagcacacccaaacagggacacc aaccagaataacgaagctcgataaagtggtgtctggattttcactgaaatcctgtgcactttct[a/c]atctgggtaattatcgacttcttgatgatgtaattcaaccattaaatatgctgatgattac agtagatctcaCTCAGGATACCAGCTTATGCTCA	294
F11u15	F11	A	T	I	F	cds	GE356	TTCTGGCTGAG AGTGACCAG	GAAACAAAACG GTATAAACATA ATGC	TTCTGGCTGAGAGTGACCAGccccgaggaggctgatacatgctgagggagggtctcactctgaca tgtggtctgctgtctagtgttctgccattcttcattttaccatgacactgatttcttgggagaag aactggat[a/t]ttgttgctgcaaaaagtcacgaggcctgccagaaactgtgcaccaatgccgt ccgctgccagtttttacctatacccccagcccaagcatcctgcaacgaagggaagtaagccatat gaagggttatgcagacacccttgtcccgtctgcctgtgaggtGCATTATGTTTATACCGTTTTGT TTC	328
F11u16	F11	T	A	I	K	cds	GE339	GCCACACACTT CACAATGTC	CAGGCCGTAAG TCTAGTAGTGT TAAA	GCCACACACTTCACAATGTCtgggaattatttttagtaaaggaaatttctttccctctgttgttt gctccttagggtagagtcacctaagattttgcgtgtctacagtggcattttaaatcaatctgaaa taaaagaggacacatctttctttggggttcaagaaataa[t/a]aatccatgatcagtataaaat ggcagaaagcgggtatgatattgccttgttgaaactggaaaccacagtgaattacacaggtacgg agaattttatccggaaagttgtctccaatggtgaactggataaaatgTTTAACACTACTAGACTT ACGGCCTG	333
F11u2	F11	C	T	D	D	cds	GE319	GCCCCTAGAAT CTGGAAGG	GCATAAAGTTG ATGGCAAAAG	GCCCCTAGAATCTGGAAGGtactcatgtcttctgcttttatttccagcttgcaacaaagacattt atgtggacctagacatgaagggcataaactataacagctcagttgccaagagtgctcaagaatgc caagaaagatgcacggatga[c/t]gtccactgccacttttcacgtacgccacaaggcagtttcc ccagcctggagcatcggtgagtgagtcccaggacattcgagtggtcgatgaaaaacagaatcgtg atttactaaaaagCTTTGCCATCAACTTTATGC	294

FIG. 5MM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F11u3	F11	A	G	T	T	cds	GE287	TGACTTTACTT TCTCTAGGTGC TG	ACCCTCCCTCA GCATGTATC	TGACTTTACTTTCTCTAGGTGCTGtaaaaatgtttttatgtgtttgatatgatatatttctactt ccctttttgtttttgttagaaatctttgtctccttaaaacatctgagagtggattgcccagtac[a /g]cgcattaaaaagagcaaagctctttctggtttcagtctacaaagctgcaggcacagcatccc aggtaaactgagagttctgcattctggctgagagtgaccagccccgaggaggctGATACATGCTG AGGGAGGGT	269
F11u4	F11	A	T	H	L	cds	GE916	TGGAAAGGAAG ATGTAGGAAGC	GCAAATAAGAC AATCTAATTGG TTAAAGTA	TGGAAAGGAAGATGTAGGAAGCtgctcatcacaatgcttctgttgcagagtgtaccaccaaaatc aagcccaggatcgttggaggaactgcgtctgttcgtggtgagtggccgtggcaggtgaccctgca cacaacctcacccactcagagacacctgtgtggaggctccatcattggaaaccagtggatattaa cagccgctc[a/t]ctgtttctatgggtcagtaccacggctgtttttattagttcatcttcttca cacatttataaaaaatattactagcatgttaggaaataaaTACTTTAACCAATTAGATTGTCTTA TTTGC	330
F11u5	F11	A	T	I	F	cds	GE339	GCCACACACTT CACAATGTC	CAGGCCGTAAG TCTAGTAGTGT TAAA	GCCACACACTTCACAATGTCtgggaattatttttagtaaaggaaatttctttccctctgttgttt gctccttagggtagagtcacctaagattttgcgtgtctacagtggcattttaaatcaatctgaaa taaaagaggacacatctttctttggggttcaagaaataataatccatgatcagtataaaatggca gaaagcgggtatgat[a/t]ttgccttgttgaaactggaaaccacagtgaattacacaggtacgg agaattttatccggaaagttgtctccaatggtgaactggataaaatgTTTAACACTACTAGACTT ACGGCCTG	333
F11u6	F11	A	T	E	V	cds	GE324	CCTTTATGAGA TTACCACCTAA CTAGA	TTTAAAAATCT GTCTCCTCGAT GT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgt actacatcacag[a/t]atgtgtgactcagttgttgaaggacacctgctttgaaggaggggacat tactacggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtt tactcttcactttcacggcggaatcaccatctgaggatcccacccgatggtaaatgcttatgttt ctACATCGAGGAGACAGATTTTTAAA	286
F11u7	F11	C	T	D	D	cds	GE283	GTATTGTGTAT GGTTATTCTAC AAACG	AAAAACCCCAA CGCATTAAG	GTATTGTGTATGGTTATTCTACAAACGaaccaaaaaaatttttttcagacaaaatacaaaatact ctccagaaagccaagataccttagtgaccaacgaagagtgccagaagagatacagaggacataa aataacccataagatgatctgtgccggctacagggaaggagggaagga[c/t]gcttgcaaggta acagagtgttcttagccaatggaatatatgcaaattggaatgCTTAATGCGTTGGGGTTTTT	257
F11u8	F11	G	A	E	E	cds	GE352	TGAGCAAGATG TGCTGAAGAT	AGCATGCTGGC ACAGTGAA	TGAGCAAGATGTGCTGAAGATgggaagcgtctgagttgatctgtgcacctttttcttgtctcccct cgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggc atcacgagctggggcgaaggctgtgctcaaagggagcggccaggtgtttacaccaacgtggtcga [g/a]tacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattg gagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11u9	F11	T	C	L	P	cds	GE324	CCTTTATGAGA TTACCACCTAA CTAGA	TTTAAAAATCT GTCTCCTCGAT GT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgt actacatcacagaatgtgtgactcagttgttgaaggacacctgctttgaaggaggggacattact acggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtttac[t/c]cttcactttcacggcggaatcaccatctgaggatcccacccgatggtaaatgcttatgttt ctACATCGAGGAGACAGATTTTTAAA	286
F13A1d 24	F13A1	C	T	-	-	noncoding	GE284	TGCCATGAATC TTGCAGTATC	CAACTTTTAGC TTACTCTTTCA TGTG	TGCCATGAATCTTGCAGTATCtggacagaattggagatgacaaactcaca[c/t]tgcccttcct ctgtgcaatgcaggcatgtatcggtgtggccccgcctcggttcaagccatcaagcacggccatgt ctgcttccaatttgatgcacctttttgtttttgcagaggtaagcaggaagctggaggaaagtgctg ttttttctccccaacctcttaaCACATGAAAGAGTAAGCTAAAAGTTG	242
F13A1d 25	F13A1	T	C	-	-	noncoding	GE284	TGCCATGAAT TTGCAGTATC	CAACTTTTAGC TTACTCTTTCA TGTG	TGCCATGAATCTTGCAGTATCtggacagaattggagatgacaaactcacac[t/c]gcccttcct ctgtgcaatgcaggcatgtatcggtgtggccccgcctcggttcaagccatcaagcacggccatgt ctgcttccaatttgatgcacctttttgtttttgcagaggtaagcaggaagctggaggaaagtgctg ttttttctccccaacctcttaaCACATGAAAGAGTAAGCTAAAAGTTG	242

FIG. 5NN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13A1d 26	F13A1	C	T	-	-	*noncoding*	GE284	TGCCATGAATC TTGCAGTATC	CAACTTTTAGC TTACTCTTTCA TGTG	TGCCATGAATCTTGCAGTATCtggacagaattggagatgacaaactcacactgcccttcctctgt gcaatgcaggcatgtatcggtgtggccccgcctcggttcaagccatcaagcacggccatgtctgc ttccaatttgatgcacctttgtttttgcagaggtaagcaggaagctggaggaaagtgctgtttt t[c/t]tccccaacctcttaaCACATGAAAGAGTAAGCTAAAAGTTG	242
F13A1d 27	F13A1	A	G	-	-	noncoding	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctctcttaggtccgtggcactca ggtagttggttctgacatgactgtgacagttcagtttaccaatcctttaaaagaaaccctgcgaa atgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggtaaacc ttgggttggggagaccgggcaggcagtgcag[a/g]gctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1d 28	F13A1	C	G	-	-	noncoding	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTG[c/g]tgctaatgacctgcattctctctcttaggtccgtggca ctcaggtagttggttctgacatgactgtgacagttcagtttaccaatcctttaaaagaaaccctg cgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggta aaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1u 1	F13A1	A	C	P	P	cds	GE344	GCCCCTACAAG AAGGGTTTTT	AGAACAGAAAC ATCAGATTGAG TCTA	GCCCCTACAAGAAGGGTTTTTcactctgtgtttattaaatgctggtgatgtgtttagctgtggt ctgtcctttcctgtagttttacgatgccttggaatacc[a/c]gcaagaattgttaccaattatt tctctgcccatgataatgatgccaatttgcaaatggacatcttcctggaagaagatgggaacgtg aattccaaactcaccaaggattcagtgtggtgagtttgattgacaatggcattggctgatgtcac attatagtaatgttacacatttaccacaagaTAGACTCAATCTGATGTTTCTGTTCT	317
F13A1u 10	F13A1	C	T	P	L	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgacttttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatcacagcttatctctcagccaacatcaccttctacaccggggtcc[c/t]gaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13A1u 11	F13A1	T	A	L	Q	cds	GE314	GGGTAGGGAAA CTTGGAGAAAA	TTTGTCTCTGT TCCAGGATGA	GGGTAGGGAAACTTGGAGAAAAgtaaagcagaccctgtctcaagtcttgatgccaggcctgtgtg tgttttctcctactagtcaagaaagaggcggtgc[t/a]gatccaagccggcgagtacatgggtc agctgctggaacaagcgtccctgcacttctttgtcacagctcgcatcaatgagaccagggatgtt ctggccaagcaaaagtccaccgtgctaaccatccctgagatcatcatcaaggtcagtcttagcgt cTCATCCTGGAACAGAGACAAA	282
F13A1u 12	F13A1	T	A	I	N	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaa[t/a]ccggcccaactccaccgtgcag tgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtga ctccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274
F13A1u 13	F13A1	T	A	L	Q	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtggg aagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactcc ctgagacatgtgtatggcgagc[t/a]ggacgtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274

FIG. 500

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13A1u 14	F13A1	G	T	M	I	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtggg aagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactcc ctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccat[g/t]tgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274
F13A1u 15	F13A1	T	A	F	L	cds	GE251	TTTGGAAACAG TCTGGTTTGG	TGAAGTAAAAA TGTCCTTGACA ATA	TTTGGAAACAGTCTGGTTTGGtaatagtcactatgtttaaaccctgatgcagatgatgctgtgta tctggacaatgagaaagaaagagaagagtatgtcctgaatgacatcggggtaatttt[t/a]tat ggagaggtcaatgacatcaagaccagaagctggagctatggtcaggtgagccacttaaaatttgt TATTGTCAAGGACATTTTTACTTCA	220
F13A1u 16	F13A1	C	T	T	I	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatca[c/t]agcttatctctcagccaacatcaccttctacaccggggtcccgaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13A1u 17	F13A1	T	A	-	-	noncoding	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctc[t/a]cttaggtccgtggca ctcaggtagttggttctgacatgactgtgacagttcagtttaccaatcctttaaaagaaaccctg cgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggta aaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1u 18	F13A1	G	T	V	L	cds	GE256	TTCTGAAGGAC CTTGTAAAGTC AA	ACCCAGAGTGG TGGGGAAG	TTCTGAAGGACCTTGTAAAGTCAAaaatgtcagaaacttccaggaccgcctttggaggcagaaga gcagttccacccaataactctaatgcagcggaagatgacctgcccacagtggagcttcagggc[g /t]tggtgccccggggcgtcaacctgcaaggtatgagcataccccccTTCCCCACCACTCTGGGT	195
F13A1u 19	F13A1	T	A	D	E	cds	GE344	GCCCCTACAAG AAGGGTTTTT	AGAACAGAAAC ATCAGATTGAG TCTA	GCCCCTACAAGAAGGGTTTTTtcactctgtgtttattaaatgctggtgatgtgtttagctgtggt ctgtcctttcctgtagttttacgatgccttggaataccagcaagaattgttaccaattatttctc tgcccatgataatgatgccaatttgcaaatggacatcttcctggaagaagatgggaacgtgaatt ccaaactcaccaagga[t/a]tcagtgtggtgagtttgattgacaatggcattggctgatgtcac attatagtaatgttacacatttaccacaagaTAGACTCAATCTGATGTTTCTGTTCT	317
F13A1u 2	F13A1	C	T	S	S	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtc[c/t]aacgttgacatggactttgaa gtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaa ccgttacaccatcacagcttatctctcagccaacatcaccttctacaccggggtcccgaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13A1u 20	F13A1	A	G	E	E	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatcacagcttatctctcagccaacatcaccttctacaccggggtcccgaaggcaga[a/ g]ttcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406

FIG. 5PP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13A1u 21	F13A1	T	A	D	E	cds	GE289	TGATGGCTAAT GCTCTCCTC	GAACTCATCTC TGAGTGACAAT GAA	TGATGGCTAATGCTCTCCTCtcctgtttccaggtcaacagcgacctcatttacattacagctaag aaaga[t/a]ggcactcatgtggtggaaaatgtggatgccacccacattgggaaattaattgtga ccaaacaaattggaggagatggcatgatggatattactgatacttacaaattccaagaaggtaat ttactaccactgaatgaagatttatttgcccaagtccattgagtacttaTTCATTGTCACTCAGA GATGAGTTC	269
F13A1u 22	F13A1	G	C	G	G	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatcacagcttatctctcagccaacatcaccttctacaccgg[g/c]gtcccgaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13A1u 23	F13A1	G	A	V	I	cds	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctctcttaggtccgtggcactca ggtagttggttctgacatgactgtgaca[g/a]ttcagtttaccaatcctttaaaagaaaccctg cgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggta aaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1u 3	F13A1	T	A	A	A	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatcacagc[t/a]tatctctcagccaacatcaccttctacaccggggtcccgaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13A1u 4	F13A1	C	G	Q	E	cds	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctctcttaggtccgtggcactca ggtagttggttctgacatgactgtgacagtt[c/g]agtttaccaatcctttaaaagaaaccctg cgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggta aaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1u 5	F13A1	T	A	S	T	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaac[t/a]ccaccgtgcag tgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtga ctccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274
F13A1u 6	F13A1	C	A	A	A	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtggg aagaagtgtgccggccctgggtctctgggcatcggaagctgatagc[c/a]agcatgagcagtga ctccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274
F13A1u 7	F13A1	C	T	D	D	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtggg aagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactcc ctgagacatgtgtatggcgagctgga[c/t]gtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274

FIG. 5QQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13A1u8	F13A1	T	C	D	D	cds	GE344	GCCCCTACAAG AAGGGTTTTT	AGAACAGAAAC ATCAGATTGAG TCTA	GCCCCTACAAGAAGGGTTTTTcactctgtgtttattaaatgctggtgatgtgtttagctgtggt ctgtccttttcctgtagttttacgatgccttggaataccagcaagaattgttaccaattatttctc tgcccatga[t/c]aatgatgccaatttgcaaatggacatcttcctggaagaagatgggaacgtg aattccaaactcaccaaggattcagtgtggtgagtttgattgacaatggcattggctgatgtcac attatagtaatgttacacatttaccacaagaTAGACTCAATCTGATGTTTCTGTTCT	317
F13A1u9	F13A1	C	A	P	T	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtatttttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatcacagcttatctctcagccaacatcaccttctacaccggggtc[c/a]cgaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13Bd20	F13B	T	G	-	-	noncoding	GE264	AAAATTGAAAG GCTGAGATTGT AA	CAAATATTTAA GCAAGGAAAAA CTCC	AAAATTGAAAGGCTGAGATTGTAA[t/g]taacacctgactgcaattgatgcttatttcaaaaat ctctctttttcccctcaagcactctgtcttatcaagaacccttaagaacatagaaatgaatggca gaaagaggagtcatatttcaatacatcatgaaattccttataaaatataatttgaggaaalaag ttaaaaacttcGGAGTTTTCCTTGCTTAAATATTTG	232
F13Bd21	F13B	A	T	E	V	cds	GE370	CTTGAAGAAGC TTTGCTAAAAT G	GCCTAAGCAGT GGTCTTTTCCT A	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactg tacctttcagaaggacaggagaaggtagcctgtgaggaaccacccttcattgaaaatggtgcag caaatttacactctaagatttattacaatggggataaagtgacatatgcatgtaaaagcggctac cttctccatggatcgaatgagataacttgtaatcgtggaaaatggacacttcctcctg[a/t]gt gtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaattttccattctg ttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bd22	F13B	A	G	Q	Q	cds	GE373	CCAAAATGAAA TCGCCAATAAT A	TTCCTGCATTG TAGACATAATG A	CCAAAATGAAATCGCCAATAATAacattatacttttggcttaattttacaatttagtaaaagaca agcttagtttcatcattaagttaaataatttttttttcccatagaaaaatgcactaagcctgacct gagtaatggttacatctctgatgtaaagttattgtataaaattca[a/g]gagaacatgcattat ggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctga tggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaa gataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctattatttaatag aatttatttttTCATTATGTCTACAATGCAGGAA	423
F13Bd23	F13B	T	C	-	-	noncoding	GE373	CCAAAATGAAA TCGCCAATAAT A	TTCCTGCATTG TAGACATAATG A	CCAAAATGAAATCGCCAATAATAacatta[t/c]acttttggcttaattttacaatttagtaaaa gacaagcttagtttcatcattaagttaaataatttttttttcccatagaaaaatgcactaagcctg acctgagtaatggttacatctctgatgtaaagttattgtataaaattcaagagaacatgcattat ggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctga tggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaa gataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctattatttaatag aatttatttttTCATTATGTCTACAATGCAGGAA	423
F13Bd24	F13B	T	A	-	-	noncoding	GE373	CCAAAATGAAA TCGCCAATAAT A	TTCCTGCATTG TAGACATAATG A	CCAAAATGAAATCGCCAATAATAacattatacttttggcttaattttacaatttagtaaaagaca agcttagtttcatcattaagttaaataatttttttttcccatagaaaaatgcactaagcctgacct gagtaatggttacatctctgatgtaaagttattgtataaaattcaagagaacatgcattatggtt gcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctgatgga tggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaagata agtgcttatcaagcttatattgaatatattgaagcttatattgatatctatta[t/a]ttaatag aatttatttttTCATTATGTCTACAATGCAGGAA	423

FIG. 5RR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bd25	F13B	C	T	C	C	cds	GE385	CACCTTTTCATGCATTTTTGC	TGACCACAGGAATTTTGTCAGA	CACCTTTTCATGCATTTTTGCctttatttttaattatgttgatagcagtctttgataattaaagctctcaagtagaataaattcattttagctcacagaattaaattagaataagcctaatgatatttaacaaatatataaaatgaattcataagctttttggcaaatttaatttctattctagttatgtcatgtaaatagtgcattttgttgtagcagaaaaaataaacatttgtttgtaattttattcattcttttatttgcagaattaaagtgctcttctttaagattaattgaaaatggttatttttcatcctgtaaagcaaacctatgaagaaggagatgtcgttcagtttttctgtcatgaaaattattatctaagtggatctgatttaattcaatg[c/t]tataactttggttggtacccagaatctcctgtatgcgaaggtaaatttttaaatttaatactcgcaaaatgccatgtctttatcagctttaatctctattagcTCTGACAAAATTCCTGTGGTCA	532
F13Bd26	F13B	T	C	-	-	noncoding	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaaggactccttgagttgtcacaaaagtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaaacttttagtttgtattgtcacctgattacaaatttatgtttttagatttgttttccatattcagcttgacatttactcatttcagagaaaccctgtggttttcctcatgtggaaaatggaagaattgcccaatatttactatactttttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttggctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtctccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaaatttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bd27	F13B	T	A	-	-	noncoding	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaaggactccttgagttgtcacaaaagtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaaacttttagtttgtattgtcacctgattacaaatttatgtttttagatttgttttccatattcagcttgacatttactcatttcagagaaaccctgtggttttcctcatgtggaaaatggaagaattgcccaatattactatactttttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttggctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtctccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaaatttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bd28	F13B	C	G	-	-	noncoding	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaaggact[c/g]cttgagttgtcacaaaagtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaaacttttagtttgtattgtcacctgattacaaatttatgtttttagatttgttttccatattcagcttgacatttactcatttcagagaaaccctgtggttttcctcatgtggaaaatggaagaattgcccaatattactatactttttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttggctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtctccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaaatttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bd29	F13B	G	A	T	T	cds	GE481	CAATTTTGCCAAGAGTTGATT	TTCTCTATGAGAAAAAGCTTTCAG	CAATTTTGCCAAGAGTTGATTTtaccatgtattcttaagatttgtaaaaccatattttgagatttttataatctaggttattaaaaagtttataaaataaataatttttataattttagaaac[g/a]tgtttggctcctgaattatataatggaaattattccacaacacagaaaacattcaaagtgaaggacaaagtacaatacgaatgtgctactggctactacacagctggaggaaagaagacagaggaggtagaatgtctcacatacggatggtctctcacaccaaaatgtaccagtaggttctcatttggaataaaatctactctcactCTGAAAGCTTTTTCTCATAGAGAA	360
F13Bd30	F13B	A	G	-	-	noncoding	GE481	CAATTTTGCCAAGAGTTGATT	TTCTCTATGAGAAAAAGCTTTCAG	CAATTTTGCCAAGAGTTGATTTtaccatgtattcttaagatttgt[a/g]aaaccatattttgagatttttataatctaggttattaaaaagtttataaaataaataatttttataattttagaaacgtgtttggctcctgaattatataatggaaattattccacaacacagaaaacattcaaagtgaaggacaaagtacaatacgaatgtgctactggctactacacagctggaggaaagaagacagaggaggtagaatgtctcacatacggatggtctctcacaccaaaatgtaccagtaggttctcatttggaataaaatctactctcactCTGAAAGCTTTTTCTCATAGAGAA	360

FIG. 5SS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bu11	F13B	A	T	-	-	noncoding	GE358	GATGCTTGACA CGATGAATATT TTA	GTACAGTTGAA AGAGAACTGAC CA	GATGCTTGACACGATGAATATTTTAatttaatctttattatttttgtaattatatgactaaagg tgctgatta[a/t]ttttttccataaggaagaagaaacagatgtcctcctccacctctgcccata aactccaaaattcaaacacattcaacaacttatcgtcatggagaaatagttcatatagaatgtga acttaattttgagatccatgggtcagcagaaatacgttgtgaagatggaaaatcgacagaacctc caaaatgcattggttagtaacaccttgaagaagctttgctaaaatgaaatctgcatgtgtagcta aaTGGTCAGTTCTCTTTCAACTGTAC	351
F13Bu10	F13B	C	T	N	N	cds	GE365	CAACACAACGA TTCCTGTTCTT	GAGTGGTATAG AACATAACATT TCTGA	CAACACAACGATTCCTGTTCTTaccaagatgtaacaagatagttttcttctttttctttctttttt ttttaaattgttgttcccagagccatgcacattatcttttactgaaatggaaaagaataatttac ttctgaaatgggattttgacaa[c/t]agaccacacattttgcatggtgaatatattgagtttat ttgtagaggagatacttatccagctgaattatatattactggatctatacttagaatgcaatgtg acagagggcagttaaaatatccaagatgtattccaagacaaaggtaagaagtttttttttttgg tcagattatttttttggtcagattgttattcaacattTCAGAAATGTTATGTTCTATACCACTC	390
F13Bu11	F13B	T	C	G	G	cds	GE396	TGTTGGATGTT TAAAGTCATTT GC	CATTTTTATTG GACCCCTATTT T	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaaggactccttgagttgtcacaaaa gtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaaacttttagttt gtattgtcacctgattacaaatttatgtttttagatttgtttttccatattcagcttgacattta ctcatttcagagaaaccctgtggttttcctcatgtggaaaatggaagaattgcccaatattacta tacttttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttggctg g[t/c]tataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtc tccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaa atttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bu12	F13B	A	G	H	R	cds	GE370	CTTGAAGAAGC TTTGCTAAAAT G	GCCTAAGCAGT GGTCTTTTCCT A	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactg tacctttcagaaggacaggagaaggtagcctgtgaggaaccacccttcattgaaaatggtgcag caaatttac[a/g]ctctaagatttattacaatggggataaagtgacatatgcatgtaaaagcgg ctaccttctccatggatcgaatgagataacttgtaatcgtggaaaatggacacttcctcctgagt gtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaattttccattctg ttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bu13	F13B	A	T	-	-	noncoding	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaacttatttttgc[a/t]gaatctaaaggaatgtgcacatctcctcctcttattaaacatg gagtcattattagttcaacagtagacacctatgaaaatggctcttcagtagaatacagatgtttt gatcaccatttcctagaaggatctagggaggcctattgtttagatggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatatttttaatttg ctgtcatttttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383
F13Bu14	F13B	T	G	D	E	cds	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaacttatttttgcagaatctaaaggaatgtgcacatctcctcctcttattaaacatggagt cattattagttcaacagtagacacctatgaaaatggctcttcagtagaatacagatgttttgatc accatttcctagaaggatctagggaggcctattgtttaga[t/g]ggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatatttttaatttg ctgtcatttttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383
F13Bu15	F13B	A	C	Y	S	cds	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaacttatttttgcagaatctaaaggaatgtgcacatctcctcctcttattaaacatggagt cattattagttcaacagtagacacct[a/c]tgaaaatggctcttcagtagaatacagatgtttt gatcaccatttcctagaaggatctagggaggcctattgtttagatggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatatttttaatttg ctgtcatttttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383

FIG. 5TT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bu16	F13B	T	C	P	P	cds	GE370	CTTGAAGAAGC TTTGCTAAAAT G	GCCTAAGCAGT GGTCTTTTCCT A	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactg tacctttcagaaggacaggagaaggtagcctgtgaggaaccaccttcattgaaaatggtgcag caaatttacactctaagatttattacaatggggataaagtgacatatgcatgtaaaagcggctac cttctccatggatcgaatgagataacttgtaatcgtggaaaatggacacttcc[t/c]cctgagt gtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaattttccattctg ttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bu17	F13B	T	A	N	K	cds	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaattttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaatttaaaacaacctctttttcttagaaaa[t/a]aatgagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacgggatattggcaa gctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaa atatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacac atggaatgtctacgtttgtacttttatgtgattttcttacagtgttttatatcatgaaaatgatg attttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu18	F13B	G	C	L	L	cds	GE264	AAAATTGAAAG GCTGAGATTGT AA	CAAATATTTAA GCAAGGAAAAA CTCC	AAAATTGAAAGGCTGAGATTGTAATtaacacctgactgcaattgatgcttatttcaaaaatctct ctttttcccctcaagcactct[g/c]tcttatcaagaacccttaagaacatagaaatgaatggca gaaagaggagtcatatttcaatacatcatgaaattccttataaaatataatttgaggaaataag ttaaaaacttcGGAGTTTTTCCTTGCTTAAATATTTG	232
F13Bu19	F13B	T	A	N	K	cds	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaattttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaatttaaaacaacctctttttcttagaaaataa[t/a]gagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacgggatattggcaa gctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaa atatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacac atggaatgtctacgtttgtacttttatgtgattttcttacagtgttttatatcatgaaaatgatg attttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu2	F13B	A	G	M	V	cds	GE396	TGTTGGATGTT TAAAGTCATTT GC	CATTTTTATTG GACCCCTATTT T	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaaggactccttgagttgtcacaaaa gtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaaacttttagttt gtattgtcacctgattacaaatttatgtttttagatttgtttttccatattcagcttgacattta ctcatttcagagaaaccctgtggttttcctcatgtggaaaatggaagaattgcccaatattacta tacttttaaaagctttactttcca[a/g]tgagcatagacaaaaaattgtcatttttctgcttg gctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtc tccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaa atttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bu3	F13B	A	G	H	R	cds	GE373	CCAAAATGAAA TCGCCAATAAT A	TTCCTGCATTG TAGACATAATG A	CCAAAATGAAATCGCCAATAATAacattatacttttggcttaattttacaatttagtaaaagaca agcttagtttcatcattaagttaaataatttttttttcccatagaaaaatgcactaagcctgacct gagtaatggttacatctctgatgtaaagttattgtataaaattcaagagaacatgc[a/g]ttat ggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctga tggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaa gataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctattatttaatag aatttattttTCATTATGTCTACAATGCAGGAA	423

FIG. 5UU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bu4	F13B	A	T	N	Y	cds	GE358	GATGCTTGACA CGATGAATATT TTA	GTACAGTTGAA AGAGAACTGAC CA	GATGCTTGACACGATGAATATTTTAatttaatctttattatttttgtaattatatgactaaagg tgctgattaatttttccataaggaagaagaaacagatgtcctcctccacctctgcccataaact ccaaaattcaaacacattcaacaacttatcgtcatggagaaatagttcatatagaatgtgaactt [a/t]attttgagatccatgggtcagcagaaatacgttgtgaagatggaaaatcgacagaacctc caaaatgcattggttagtaacaccttgaagaagctttgctaaaatgaaatctgcatgtgtagcta aaTGGTCAGTTCTCTTTCAACTGTAC	351
F13Bu5	F13B	C	T	P	S	cds	GE370	CTTGAAGAAGC TTTGCTAAAAT G	GCCTAAGCAGT GGTCTTTTCCT A	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactg tacctttcagaaggacaggagaaggtagcctgtgaggaaccaccttcattgaaaatggtgcag caaatttacactctaagatttattacaatggggataaagtgacatatgcatgtaaaagcggctac cttctccatggatcgaatgagataacttgtaatcgtggaaaatggacactt[c/t]ctcctgagt gtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaattttccattctg ttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bu6	F13B	T	A	M	K	cds	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaattttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaattttaaaacaacctcttttcttagaaaataat gagaattgtaagcatcctcctgttgtaa[t/a]gaatggggctgttgcagacgggatattggcaa gctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaa atatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacac atggaatgtctacgtttgtacttttatgtgatttttcttacagtgttttatatcatgaaaatgatg attttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu7	F13B	T	A	I	K	cds	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaattttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaattttaaaacaacctcttttcttagaaaataat gagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacggga[t/a]attggcaa gctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaa atatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacac atggaatgtctacgtttgtacttttatgtgatttttcttacagtgttttatatcatgaaaatgatg attttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu8	F13B	G	A	-	-	noncoding	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaattttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaattttaaaacaacctcttttcttagaaaataat gagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacgggatattggcaagcta tgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaaatat ctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaa[g/a]agaacac atggaatgtctacgtttgtacttttatgtgatttttcttacagtgttttatatcatgaaaatgatg attttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu9	F13B	T	A	-	-	noncoding	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaact[t/a]atttttgcagaatctaaaggaatgtgcacatctcctcctcttattaaacatg gagtcattattagttcaacagtagacacctatgaaaatggctcttcagtagaatacagatgtttt gatcaccatttcctagaaggatctagggaggcctattgtttagatggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatatttttaatttg ctgtcatttttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383

FIG. 5VV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5d47	F5	G	A	-	-	noncoding	GE949	TCCCTAACCAT GGAGTTTTACT TT	GCACAACTGTA GGGGGTA	TCCCTAACCATGGAGTTTTACTTTatt[g/a]tatatattttctaagcaaaaattattcatttttttctgtttttcatagactgtaggatgccaatgggactaagcactggtatcatatctgattcacagatcaaggcttcagagtttctgggtaagttgtagcacatggtctgtgaatggTACCCCCTACAGTTGTGC	200
F5d48	F5	A	G	-	-	noncoding	GE316	GCAAAGGTTTT AACATCTTCCT T	GCACAGTCTTC AGATTGCTTT	GCAAAGGTTTTAACATCTTCCTTatctatgtgtttttgtcattttc[a/g]taggcaaacaacaataagcagtggctagaaattgatctactcaagatcaagaagataacggcaattataacacagggctgcaagtctctgtcctctgaaatgtatgtaaagagctataccatccactacagtgagcagggagtggaatggaaaccatacaggctgaaatcctccatggtggacaaggtagagtggcatctgggcaaagagAAAGCAATCTGAAGACTGTGC	282
F5d49	F5	C	G	H	Q	cds	GE387	GTGCCCCCAGA GGAACACTA	TCATATGGCTG AGTTCTGGAG	GTGCCCCCAGAGGAACACTAtcaaacattccccattcaagaccctgatcaaatgcactctacttcagaccccagtca[c/g]agatcctcttctccagagctcagtgaaatgcttgagtatgaccgaagtcacaagtccttccccacagatataagtcaaatgtccccttcctcagaacatgaagtctggcagacagtcatctctccagacctcagccaggtgaccctctctccagaactcagccagacaaacctctctccagacctcagccacacgactctctctccagaactcattcagagaaacctttccccagccctcggtcagatgcccatttctccagacctcagccatacaacccttctctccagacctcagccatacaaccctttctttagacctcagccagacaaacctctctccagaactcagtcagacaaacctttctccagccctcggtcagatgcccctttctccagacctcagccatacaacccttctctagacttcagccagacaacctctCTCCAGAACTCAGCCATATGA	548
F5d50	F5	A	G	T	T	cds	GE389	GAAAGGTAGCT ATGAAATAATC CAAGA	GGGTCTTGAAT GGGGAATGT	GAAAGGTAGCTATGAAATAATCCAAGAtactgatgaagacacagctgttaacaattggctgatcagcccccagaatgcctcacgtgcttggggagaaagcacccctcttgccaacaagcctggaaagcagagtggccacccaaagtttcctagagttagacataaatctctacaagtaagacaggatggaggaaagagtagactgaagaaaagccagtttctcattaagacacgaaaaaagaaaaaagagaagcacacaccaccatgctcctttatctccgaggacctttcaccctctaagaagtgaagcctacaacacattttcagaaagaagacttaagcattcgttggtgcttcataaatccaatgaaacatctcttcccacagacctcaatcagac[a/g]ttgccctctatggattttggctggatagcctcacttcctgaccataatcagaattcctcaaatgacactggtcaggcaagctgtcctccaggtctttatcagacagtgccccccagaggaacactatcaaACATTCCCCATTCAAGACCC	553
F5d51	F5	A	C	E	A	cds	GE496	CTTTCTCCAGA CCTTGGTGAG	AAGGAGAAAAC TGGCCAAAC	CTTTCTCCAGACCTTGGTGAGacagatctttccccaaactttggtcagatgtccctttccccagacctcagccaggtgactctctctccagacatcagtgacaccaccctttctcccggatctcagccagatatcacctcctccagaccttgatcagatattctacccttctgaatctagtcagtcattgcttcttcaagaatttaatgagtcttttccttatccagaccttggtcagatgccatctccttcatctcctactctcaatgatacttttctatcaaaggaatttaatccactggttatagtgggcctcagtaaagatggtacagattacattgagatcattccaaaggaag[a/c]ggtccagagcagtgaagatgactatgctgaaattgattatgtgccctatgatgacccctacaaaactgatgttaggacaaacatcaactcctccagagatcctgacaacattgcagcatggtacctccgcagcaacaatggaaacagaagaaattattacattgctgctgaagaaatatcctgggattattcagaatttgtacaaagGTTTGGCCAGTTTTCTCCTT	590

FIG. 5WW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5d52	F5	C	A	-	-	noncoding	GE910	GCAGGGAATAT TGGTGTG	TTTACTGATAC AATGGCAGAGT T	GCAGGGAATATTGGTGTGtaattaatca[c/a]ggaaaccaccacatgacaggatgttccacacc cctgggtatggaaaatggaaagatagaaaacaagcaaatcacagcttcttcgtttaagaaatctt ggtggggagattactgggaacccttccgtgcccgtctgaatgcccagggacgtgtgaatgcctgg caagccaaggtcaagtatactctatgcatggtgttctcttagggctccaaaaaaaagcaaaggcc ctcactaccacaaacatggaggatctgggaagcaggagtattttaatctgtttctgcaaattaaa atcctaggtccaanagtccaggatgtctgtggacttgatanctttgactataactttgtctcaaa aanaagtcatttatcatctctgtggtttttggtctattcttgatttaaaccaataataagcaaat taatttttctgcaaagggatanatggtaaatattttagtctttgtgggccatacattctctgcca taactactcAACTCTGCCATTGTATCAGTAAA	552
F5d53	F5	C	T	-	-	noncoding	GE915	TGATTATCAGA AGAGCAAGGAA A	ACTGTGACCCA GTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccagg aaaaagatattcactcaggcttgataggtcccctcctaatctgccaaaaaggaata-tacataag gacagcaacatgcctatggacatgagagaatttgtcttactatttatgacctttgatgaaaagaa gagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaaaaat cccatgagtttcacggtattttcct[c/t]ggactttgatctaatctcctaatTAAATCACACTG GGTCACAGT	334
F5d54	F5	A	G	-	-	noncoding	GE915	TGATTATCAGA AGAGCAAGGAA A	ACTGTGACCCA GTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccagg aaaaagatattcactcaggcttgataggtcccctcctaatctgccaaaaaggaata-tacataag gacagcaacatgcctatggacatgagagaatttgtcttactatttatgacctttgatgaaaagaa gagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaaaaat cccatgagtttcacggtattttcctc[a/g]gactttgatctaatctcctaatTAAATCACACTG GGTCACAGT	334
F5d55	F5	A	G	G	G	cds	GE923	GATCATTCCTT TTCCTAGGTT	TTCAGATTACG AGGTTAGGGGA	GATCATTCCTTTTCCTAGGTTcgttttaaaaatttagcatccagaccgtattctctacatgccca tgg[a/g]ctttcctatgaaaaatcatcagagggaaagacttatgaagatgactctcctgaatgg tttaaggaagataatgctgttcagccaaatagcagttatacctacgtatggcatgccactgagcg atcagggccagaaagtcctggctctgcctgtcgggcttgggcctactactcagctgtgaacccag taggtactttcattgaaagtttttctcatTCCCCTAACCTCGTAATCTGAA	311
F5d56	F5	C	G	T	S	cds	GE923	GATCATTCCTT TTCCTAGGTT	TTCAGATTACG AGGTTAGGGGA	GATCATTCCTTTTCCTAGGTTcgttttaaaaatttagcatccagaccgtattctctacatgccca tggactttcctatgaaaaatcatcagagggaaaga[c/g]ttatgaagatgactctcctgaatgg tttaaggaagataatgctgttcagccaaatagcagttatacctacgtatggcatgccactgagcg atcagggccagaaagtcctggctctgcctgtcgggcttgggcctactactcagctgtgaacccag taggtactttcattgaaagtttttctcatTCCCCTAACCTCGTAATCTGAA	311
F5d57	F5	G	A	-	-	noncoding	GE924	TTGCTTGCCCT AAACTCTTTG	GAAAACAGGAC CGAAAAATTAC TA	TTGCTTGCCCTAAACTCTTTGntatccaggaaagntaatgagn[g/a]tnttttatctgcagtgc tactgaaaacaagtctttccttttcatagggaccctaactgagggtgggacacagaagacgtttga caagcaaatcgtgctactatttgctgtgtttgatgaaagcaagagctggagccagtcatcatccc taatgtacacagtcaatggatatgtgaatgggacaatgccaggtaacacgagggctgtgtaccat taaacaacagtaaaatcatTAGTAATTTTTCGGTCCTGTTTTC	303
F5u1	F5	C	T	N	N	cds	GE173	AAATTTGATTT AACTTTGTAGA TCGTG	GGATTCAGTAG AAGTGAAAGAT TCAA	AAATTTGATTTAACTTTGTAGATCGTGttcaaaaatatggccagccgcccctatagcatttaccc tcatggagtgaccttctcgccttatgaagatgaagtcaa[c/t]tcttctttcacctcaggtTTG AATCTTTCACTTCTACTGAATCC	153

FIG. 5XX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u10	F5	T	C	I	I	cds	GE494	TCTGTCTCTCT TCTGTAGGAAC T	CCCTGTGACAT CTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtgatgttaacttccatgaattctagtccaagaagcaaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaat[t/c]aggtc attccgaaactcatcattgaaccaggaagaagaagagttcaatcttactgccctagctctggaga atggcactgaattcgtttcttcgaacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u11	F5	C	T	N	N	cds	GE494	TCTGTCTCTCT TCTGTAGGAAC T	CCCTGTGACAT CTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaattaggtcattc cgaaactcatcattgaa[c/t]caggaagaagaagagttcaatcttactgccctagctctggaga atggcactgaattcgtttcttcgaacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u12	F5	A	C	N	T	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaaga[a/c] ctcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatc ctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaa gaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u13	F5	G	A	R	K	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattca[g/a]aagtcaa gaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u14	F5	C	T	T	T	cds	GE387	GTGCCCCCAGA GGAACACTA	TCATATGGCTG AGTTCTGGAG	GTGCCCCCAGAGGAACACTAtcaaacattccccattcaagaccctgatcaaatgcactctacttc agaccccagtcacagatcctcttctccagagctcagtgaaatgcttgagtatgaccgaagtcaca agtccttccccacagatataagtcaaatgtccccttcctcagaacatgaagtctggcagacagtc atctctccagacctcagccaggtgac[c/t]ctctctccagaactcagccagacaaacctctctc cagacctcagccacacgactctctctccagaactcattcagagaaacctttccccagccctcggt cagatgcccatttctccagacctcagccatacaaccctttctccagacctcagccatacaaccct ttctttagacctcagccagacaaacctctctccagaactcagtcagacaaacctttctccagccc tcggtcagatgccccttttctccagacctcagccatacaaccctttctctagacttcagccagaca aacctctCTCCAGAACTCAGCCATATGA	548

FIG. 5YY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u15	F5	T	G	S	A	cds	GE395	GACCTCAGCCA GACAAACCT	TCTGATCAAGG TCTGGAGGA	GACCTCAGCCAGACAAACCTctctccagaactcagtcagacaaacctttctccagccctcggtca gatgcccctttctccagacctcagccatacaacccttttctctagacttcagccagacaaacctct ctccagaactcagccatatgactctctctccagaactcagtcagacaaacctttccccagccctc ggtcagatgcccatttctccagacctcagccatacaacccttttctctagacttcagccagacaaa cctctctccagaactcagtcaaacaaacctttccccagccctcggtcagatgcccctttctccag accccagccatacaacccttttctctagacctcagccagacaaacctctctccagaactcagtcag acaaaacctttccccagacctcagtgagatgcccctctttgcagatctcagtcaaattccccttac ccagacctcgaccagatgacactttctccagaccttggtgagacagatctt[t/g]ccccaaac tttggtcagatgtccctttccccagacctcagccaggtgactctctctccagacatcagtgacac caccctttctcccggatctcagccagatatcaccTCCTCCAGACCTTGATCAGA	638
F5u16	F5	C	A	S	S	cds	GE496	CTTTCTCCAGA CCTTGGTGAG	AAGGAGAAAAC TGGCCAAAC	CTTTCTCCAGACCTTGGTGAGacagatctttccccaaactttggtcagatgtccctttccccaga cctcagccaggtgactctctctccagacatcagtgacaccaccctttctcccggatctcagccaga tatcacctcctccagaccttgatcagatattctacccttctgaatctagtcagtcattgcttctt caagaatttaatgagtcttttccttatccagaccttggtcagatgccatctccttcatctcctac tctcaatgatacttttctatcaaaggaatttaatccactggttatagtgggcctcagtaaagatg gtacagattacattgagatcattccaaaggaagaggtccagagcagtgaagatgactatgctgaa attgattatgtgccctatgatgacccctacaaaactgatgttaggacaaacatcaactc[c/a]t ccagagatcctgacaacattgcagcatggtacctccgcagcaacaatggaaacagaagaaattat tacattgctgctgaagaaatatcctgggattattcagaatttgtacaaagGTTTGGCCAGTTTTC TCCTT	590
F5u17	F5	A	T	N	I	cds	GE316	GCAAAGGTTTT AACATCTTCCT T	GCACAGTCTTC AGATTGCTTT	GCAAAGGTTTTAACATCTTCCTTatctatgtgtttttgtcattttcataggcaaaca[a/t]caa taagcagtggctagaaattgatctactcaagatcaagaagataacggcaattataacacagggct gcaagtctctgtcctctgaaatgtatgtaaagagctataccatccactacagtgagcagggagtg gaatggaaaccatacaggctgaaatcctccatggtggacaaggtagagtggcatctgggcaaaga gAAAGCAATCTGAAGACTGTGC	282
F5u18	F5	G	C	D	H	cds	GE267	TGATGACCCTG AATACAGACAT AGT	AGTTTTAAATG TTGATGCTGGT ATT	TGATGACCCTGAATACAGACATAGTttaaatatttgttttcacaggacttcttgggcctacttta tatgctgaagtcggagacatcataaaagttcactttaaaaataaggca[g/c]ataagcccttga gcatccatcctcaaggaattaggtacagtaaattatcagaaggtaagataaatctaatatttttc tgaaaagggaaaatgtctaagtctttAATACCAGCATCAACATTTAAAACT	246
F5u19	F5	G	A	K	K	cds	GE267	TGATGACCCTG AATACAGACAT AGT	AGTTTTAAATG TTGATGCTGGT ATT	TGATGACCCTGAATACAGACATAGTttaaatatttgttttcacaggacttcttgggcctacttta tatgctgaagtcggagacatcataaaagttcactttaaaaataaggcagataa[g/a]cccttga gcatccatcctcaaggaattaggtacagtaaattatcagaaggtaagataaatctaatatttttc tgaaaagggaaaatgtctaagtctttAATACCAGCATCAACATTTAAAACT	246
F5u2	F5	G	A	R	K	cds	GE47	GAAATAACTTT GCAAATGAAAA CA	TTTCTGAAAGG TTACTTCAAGG AC	GAAATAACTTTGCAAATGAAAACAattttgaatatattttctttcaggcaggaacaacaccatga tcagagcagttcaaccaggggaaacctatacttataagtggaacatcttagagtttgatgaaccc acagaaaatgatgcccagtgcttaacaagaccatactacagtgacgtggacatcatga[g/a]ag acatcgcctctgggctaataggactacttctaatctgtaagagcagatccctggacaggcgagga atacaggtattttGTCCTTGAAGTAACCTTTCAGAAA	297

SUBSTITUTE SHEET (RULE 26)

FIG. 5ZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u20	F5	G	A	S	S	cds	GE494	TCTGTCTCTCT TCTGTAGGAAC T	CCCTGTGACAT CTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaattaggtcattc cgaaactcatcattgaaccaggaagaagaagagttcaatcttactgccctagctctggagaatgg cactgaattcgtttcttc[g/a]aacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u21	F5	G	A	R	H	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaac atgctaagc[g/a]taagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u22	F5	A	G	R	G	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaac atgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatg aaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgag gccctgggaggaccttcctagccaagacactggttctccttcc[a/g]gaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u23	F5	T	A	L	Q	cds	GE316	GCAAAGGTTTT AACATCTTCCT T	GCACAGTCTTC AGATTGCTTT	GCAAAGGTTTTAACATCTTCCTTatctatgtgtttttgtcattttcataggcaaacaacaataag cagtggctagaaattgatctactcaagatcaagaagataacggcaattataacacagggctgcaa gtctctgtcctctgaaatgtatgtaaagagctataccatccactacagtgagcagggagtggaat ggaaaccatacaggc[t/a]gaaatcctccatggtggacaaggtagagtggcatctgggcaaaga gAAAGCAATCTGAAGACTGTGC	282
F5u24	F5	A	T	G	G	cds	GE267	TGATGACCCTG AATACAGACAT AGT	AGTTTTAAATG TTGATGCTGGT ATT	TGATGACCCTGAATACAGACATAGTttaaatatttgttttcacaggacttcttgggcctacttta tatgctgaagtcgg[a/t]gacatcataaaagttcactttaaaaataaggcagataagccccttga gcatccatcctcaaggaattaggtacagtaaattatcagaaggtaagataaatctaatatttttc tgaaaagggaaaatgtctaagtctttAATACCAGCATCAACATTTAAAACT	246
F5u25	F5	G	T	S	S	cds	GE362	GCTATCCCAGA TTTGAGAGTGG T	TTTGTCCCATG ACAGAACTCC	GCTATCCCAGATTTGAGAGTGGTgaaaacgcaatcctcagaaactgcccacatgtcttgatggct gttactcctccaggtgcttcttaccttgaccacacattccctgcggagaagatggacgacgctgt ggctccaggccgagaatacacctatgaatggagtatcagtgaggacagtggacccacccatgatg accctccatgcctcacacacatctattactcccatgaaaatctgatcgaggatttcaactc[g/t]gggctgattgggcccctgcttatctgtaaaaaaggtaagaacacccccaccaaaagattcaaca actaaatgttggaatggtcaGGAGTTCTGTCATGGGACAAA	366

FIG. 5AAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u26	F5	C	T	-	-	noncoding	GE924	TTGCTTGCCCT AAACTCTTTG	GAAAACAGGAC CGAAAAATTAC TA	TTGCTTGCCCTAAACTCTTTGntatccaggaaagntaatgagngtntttatctgcagtgctact gaaaacaagtctttcctttcatagggaccctaactgagggtgggacacagaagacgtttgacaag caaatcgtgctactatttgctgtgtttgatgaaagcaagagctggagccagtcatcatccctaat gtacacagtcaatggatatgtgaatgggacaatgccaggtaaca[c/t]gagggctgtgtaccat taaacaacagtaaaatcatTAGTAATTTTTCGGTCCTGTTTTC	303
F5u27	F5	A	G	E	E	cds	GE494	TCTGTCTCTCT TCTGTAGGAAC T	CCCTGTGACAT CTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaattaggtcattc cgaaactcatcattgaaccaggaagaagaagagttcaatcttactgccctagctctggagaatgg cactga[a/g]ttcgtttcttcgaacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u28	F5	C	T	S	S	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccag[c/t]ccatattctgaagaccctatagaggatc ctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaa gaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u29	F5	A	T	K	*	cds	GE389	GAAAGGTAGCT ATGAAATAATC CAAGA	GGGTCTTGAAT GGGGAATGT	GAAAGGTAGCTATGAAATAATCCAAGAtactgatgaagacacagctgttaacaattggctgatca gccccagaatgcctcacgtgcttggggagaaagcacccctcttgccaacaagcctggaaagcag agtggccacccaaagtttcctagagttagacataaatctctacaagtaagacaggatggaggaaa gagtagactgaagaaaagccagtttctcattaagacacgaaaaaagaaaaaagagaagcacacac accatgctcctttatctccgaggacctttcaccctctaagaagtgaagcctacaacacattttca gaaagaagacttaagcattcgttggtgcttcat[a/t]aatccaatgaaacatctcttcccacag acctcaatcagacattgccctctatggattttggctggatagcctcacttcctgaccataatcag aattcctcaaatgacactggtcaggcaagctgtcctccaggtctttatcagacagtgcccccaga ggaacactatcaaACATTCCCCATTCAAGACCC	553
F5u3	F5	G	A	R	Q	cds	GE47	GAAATAACTTT GCAAATGAAAA CA	TTTCTGAAAGG TTACTTCAAGG AC	GAAATAACTTTGCAAATGAAAACAattttgaatatattttctttcaggcaggaacaacaccatga tcagagcagttcaaccaggggaaacctatacttataagtggaacatcttagagtttgatgaaccc acagaaaatgatgcccagtgcttaacaagaccatactacagtgacgtggacatcatgagagacat cgcctctgggctaataggactacttctaatctgtaagagcagatccctggacaggc[g/a]agga atacaggtattttGTCCTTGAAGTAACCTTTCAGAAA	297

FIG. 5BBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u30	F5	C	A	P	T	cds	GE389	GAAAGGTAGCT ATGAAATAATC CAAGA	GGGTCTTGAAT GGGGAATGT	GAAAGGTAGCTATGAAATAATCCAAGAtactgatgaagacacagctgttaacaattggctgatca gcccccagaatgcctcacgtgcttggggagaaagcacccctcttgccaacaagcctggaaagcag agtggccacccaaagtttcctagagttagacataaatctctacaagtaagacaggatggaggaaa gagtagactgaagaaaagccagtttctcattaagacacgaaaaaagaaaaaagagaagcacacac accatgctcctttatctccgaggacctttcaccctctaagaagtgaagcctacaacacattttca gaaagaagacttaagcattcgttggtgcttcataaatccaatgaaacatctcttcccacagacct caatcagacattgccctctatggattttggctggatagcctcactt[c/a]ctgaccataatcag aattcctcaaatgacactggtcaggcaagctgtcctccaggtctttatcagacagtgccccaga ggaacactatcaaACATTCCCCATTCAAGACCC	553
F5u31	F5	G	A	M	I	cds	GE925	CACTCGCCCTC TCTGTGTC	CAGATTGCCTT TTCCCTGTATT	CACTCGCCCTCTCTGTGTCaacagatttttaattgatttcaactcttngtcnnttcagccattaa tgggatgatctacagcttgcctggcctgaaaat[g/a]tatgagcaagagtgggtgaggttacac ctgctgaacataggcggctcccaagacattcacgtggttcactttcacggccagaccttgctgga aaatggcaataaacagcaccagttaggggtctggccccttctgcctggtaaagattgggtaatgg gaagagggccctgctaagaAATACAGGGAAAAGGCAATCTG	301
F5u32	F5	T	G	F	V	cds	GE910	GCAGGGAATAT TGGTGTG	TTTACTGATAC AATGGCAGAGT T	GCAGGGAATATTGGTGTGtaattaatcacggaaaccaccacatgacaggatgttccacacccctg ggtatggaaaatggaaagatagaaaacaagcaaatcacagcttcttcg[t/g]ttaagaaatctt ggtggggagattactgggaacccttccgtgcccgtctgaatgcccagggacgtgtgaatgcctgg caagccaaggtcaagtatactctatgcatggtgttctcttagggctccaaaaaaaagcaaaggcc ctcactaccacaaacatggaggatctgggaagcaggagtattttaatctgtttctgcaaattaaa atcctaggtccaanagtccaggatgtctgtggacttgatanctttgactataacttgtctcaaa aanaagtcatttatcatctctgtggtttttggtctattcttgatttaaaccaataataagcaaat taatttttctgcaaagggatanatggtaaatattttagtctttgtgggccatacattctctgcca taactactcAACTCTGCCATTGTATCAGTAAA	552
F5u33	F5	A	G	D	G	cds	GE921	AAAAACCTTAG CCATTTATGTT GT	AAGAAAGAGAA ATAGTGGAAAA C	AAAAACCTTAGCCATTTATGTTGTcattaaagattttctcttatttggctttcagattttgaag gaaatactaataccaaaggacatgtgaagaacttttcaaccccccaatcatttccaggtttatc cgtgtcattcctaaaacatggaatcaaagtattgcacttcgcctggaactctttggctgtg[a/g]tatttactagaattgaacattcaaaaacccctggaagagactctttaagacctcaaaccattta gaatgggcaatgtattttacgctgtgttaaatgttaacaGTTTTCCACTATTTCTCTTTCTT	322
F5u34	F5	A	G	Q	Q	cds	GE932	TCTACTAGAAG TCTGAAGATAT GAGAG	TGCCAAATTAC CCATAGAAAT	TCTACTAGAAGTCTGAAGATATGAGAGatctactttttttgtaatgtgagaaatagatattgaat atgcctttcaaattagtttttgtattttatttccagtttgaatctttctgtaacttcctttaaga aaattgtctacagagagtatgaaccatattttaagaaagaaaaaccaca[a/g]tctaccatttc aggtaagcctgaaatatacttttttaattttaaagataaATTTCTATGGGTAATTTGGCA	255
F5u35	F5	G	A	A	A	cds	GE362	GCTATCCCAGA TTTGAGAGTGG T	TTTGTCCCATG ACAGAACTCC	GCTATCCCAGATTTGAGAGTGGTgaaaacgcaatcctcagaaactgcccacatgtcttgatggct gttactcctccaggtgcttcttaccttgaccacacattccctgc[g/a]gagaagatggacgacg ctgtggctccaggccgagaatacacctatgaatggagtatcagtgaggacagtggacccacccat gatgaccctccatgcctcacacacatctattactcccatgaaaatctgatcgaggatttcaactc ggggctgattgggcccctgcttatctgtaaaaaaggtaagaacacccccaccaaaagattcaaca actaaatgttggaatggtcaGGAGTTCTGTCATGGGACAAA	366
F5u36	F5	G	A	V	M	cds	GE915	TGATTATCAGA AGAGCAAGGAA A	ACTGTGACCCA GTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccagg aaaaagatattcactcaggcttgataggtcccctcctaatctgccaaaaaggaata-tacataag gacagcaacatgcct[g/a]tggacatgagagaatttgtcttactatttatgacctttgatgaaa agaagagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaa aaatcccatgagtttcacggtattttcctcggactttgatctaatctcctaatTAAATCACACTG GGTCACAGT	334

FIG. 5CCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u37	F5	C	T	P	S	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttcc[c/t]cactgagacacctcattggcaagaa ctcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatc ctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaa gaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u38	F5	G	C	E	D	cds	GE362	GCTATCCCAGA TTTGAGAGTGG T	TTTGTCCCATG ACAGAACTCC	GCTATCCCAGATTTGAGAGTGGTgaaaacgcaatcctcagaaactgcccacatgtcttgatggct gttactcctccaggtgcttcttaccttgaccacacattccctgcgga[g/c]aagatggacgacg ctgtggctccaggccgagaatacacctatgaatggagtatcagtgaggacagtggacccacccat gatgaccctccatgcctcacacacatctattactcccatgaaaatctgatcgaggatttcaactc ggggctgattgggcccctgcttatctgtaaaaaaggtaagaacacccccaccaaaagattcaaca actaaatgttggaatggtcaGGAGTTCTGTCATGGGACAAA	366
F5u39	F5	G	A	E	K	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaac atgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatg aaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgag gccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgg[g/a]ag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u4	F5	T	C	M	T	cds	GE172	TTTAAGAAAAT ACAGGTCTCAG CAT	TTTCTCCCATG ATTCTGTATTT GT	TTTAAGAAAATACAGGTCTCAGCATttggataatttctcaaaccaaattggaaaacattataaga aagttatgtacacacagtacgaagatgagtccttcaccaaacatacagtgaatcccaata[t/c] gaaagaagatgggattttgggtcctattatcagagcccaggtcagagacacactcaaagtaagta acACAAATACAGAATCATGGGAGAAA	221
F5u40	F5	C	G	P	A	cds	GE391	CCCCTTCTCAC CAACAAGC	AGCACGTGAGG CATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaac atgctaagcgtaaggga[c/g]ccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u41	F5	C	G	L	V	cds	GE915	TGATTATCAGA AGAGCAAGGAA A	ACTGTGACCCA GTGTGATTTA	TGATTATCAGAAGAGCAAGGAAATtcctgagaaagaggcaatacaatttactctgtttttccagg aaaaagatattcactcaggcttgataggtcccctc[c/g]taatctgccaaaaaggaata-taca taaggacagcaacatgcctatggacatgagagaatttgtcttactatttatgacctttgatgaaa agaagagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaa aaatcccatgagtttcacggtattttcctcggactttgatctaatctcctaatTAAATCACACTG GGTCACAGT	334

FIG. 5DDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u42	F5	T	G	Y	D	cds	GE279	GAATTTAGGCA GTGTGTGACTT G	AGAGATTCAGA TAGAAATATGC ACAC	GAATTTAGGCAGTGTGTGACTTGttgacaaggacagttctgtttactggctttcctatattgcag gtggacatgcaaaaggaagtcataatcacagggatccagacccaaggtgccaaacactacctgaa gtcctgctataccacagagttc[t/g]atgtagcttacagttccaaccagatcaactggcagatc ttcaaagggaacagcacaaggaatgtgatggtttGTGTGCATATTTCTATCTGAATCTCT	255
F5u44	F5	C	A	L	I	cds	GE395	GACCTCAGCCA GACAAACCT	TCTGATCAAGG TCTGGAGGA	GACCTCAGCCAGACAAACCTctctccagaactcagtcagacaaacctttctccagccctcggtca gatgcccctttctccagacctcagccatacaacccttctctagacttcagccagacaaacctct ctccagaactcagccatatgactctctctccagaactcagtcagacaaacctttccccagccctc ggtcagatgcccatttctccagacctcagccatacaacc[c/a]tttctctagacttcagccaga caaacctctctccagaactcagtcaaacaaacctttccccagccctcggtcagatgcccctttct ccagaccccagccatacaacccttctctagacctcagccagacaaacctctctccagaactcag tcagacaaacctttccccagacctcagtgagatgcccctctttgcagatctcagtcaaattcccc ttaccccagacctcgaccagatgacactttctccagaccttggtgagacagatctttccccaaac tttggtcagatgtccctttccccagacctcagccaggtgactctctctccagacatcagtgacac caccettctcccggatctcagccagatatcaccTCCTCCAGACCTTGATCAGA	638
F5u45	F5	T	A	L	I	cds	GE923	GATCATTCCTT TTCCTAGGTT	TTCAGATTACG AGGTTAGGGGA	GATCATTCCTTTTCCTAGGTTcgttttaaaaat[t/a]tagcatccagaccgtattctctacatg cccatggactttcctatgaaaaatcatcagagggaaagacttatgaagatgactctcctgaatgg tttaaggaagataatgctgttcagccaaatagcagttatacctacgtatggcatgccactgagcg atcagggccagaaagtcctggctctgcctgtcgggcttgggcctactactcagctgtgaacccag taggtactttcattgaaagtttttctcatTCCCCTAACCTCGTAATCTGAA	311
F5u46	F5	C	A	L	I	cds	GE387	GTGCCCCCAGA GGAACACTA	TCATATGGCTG AGTTCTGGAG	GTGCCCCCAGAGGAACACTAtcaaacattccccattcaagaccctgatcaaatgcactctacttc agaccccagtcacagatcctcttctccagagctcagtgaaatgcttgagtatgaccgaagtcaca agtccttccccacagatataagtcaaatgtcccctttcctcagaacatgaagtctggcagacagtc atctctccagacctcagccaggtgaccctctctccagaactcagccagacaaacctctctccaga cctcagccacacgactctctctccagaactcattcagagaaacctttccccagccctcggtcaga tgcccatttctccagacctcagccatacaacccttctctccagacctcagccatacaacccttct ttagacctcagccagacaaacctctctccagaactcagtcagacaaacctttctccagccctcgg tcagatgcccctttctccagacctcagccatacaacc[c/a]tttctctagacttcagccagaca aacctctCTCCAGAACTCAGCCATATGA	548
F5u5	F5	A	G	K	K	cds	GE172	TTTAAGAAAAT ACAGGTCTCAG CAT	TTTCTCCCATG ATTCTGTATTT GT	TTTAAGAAAATACAGGTCTCAGCATttggataatttctcaaaccaaattggaaaacattataaga aagttatgtacacacagtacgaagatgagtccttcaccaaacatacagtgaatcccaatatgaa[a/g]gaagatgggattttgggtcctattatcagagcccaggtcagagacacactcaaagtaagta acACAAATACAGAATCATGGGAGAAA	221
F5u6	F5	G	A	E	E	cds	GE174	TCTATGCGTCT GTTCTTGTACC	CAACCACAGGA ATGAAAAACTG	TCTATGCGTCTGTTCTTGTACCagtactatactgttttgtcctccagagggcagcagacatcgaa cagcaggctgtgtttgctgtgtttgatgagaacaaaagctggtaccttgaggacaacatcaacaa gttttgtgaaaatcctgatga[g/a]gtgaaacgtgatgaccccaagttttatgaatcaaacatc atgagcagtaagtcagagtactatttttgttcatCAGTTTTTCATTCCTGTGGTTG	251
F5u7	F5	C	A	T	T	cds	GE175	TTTTACACTTT CAGCTATCAAT GG	GCTTCCTCTGT GAGTGTCCAG	TTTTACACTTTCAGCTATCAATGGctatgtgcctgagagcataactactcttggattctgctttg atgacactgtccagtggcacttctgtagtgtggggacccagaatgaaattttgaccatccacttc actgggcactcattcatctatggaaagaggcatgaggacaccttgac[c/a]ctcttccccatgc gtggagaatctgtgacggtcacaatggataatgttggtgagtaagagtCTGGACACTCACAGAGG AAGC	264

FIG. 5EEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u8	F5	G	T	-	-	noncoding	GE174	TCTATGCGTCT GTTCTTGTACC	CAACCACAGGA ATGAAAAACTG	TCTATGCGTCTGTTCTTGTACCagtactatactgtttt[g/t]tcctccagagggcagcagacat cgaacagcaggctgtgtttgctgtgtttgatgagaacaaaagctggtaccttgaggacaacatca acaagttttgtgaaaatcctgatgaggtgaaacgtgatgaccccaagttttatgaatcaaacatc atgagcagtaagtcagagtactatttttgttcatCAGTTTTTCATTCCTGTGGTTG	251
F5u9	F5	A	T	Y	F	cds	GE932	TCTACTAGAAG TCTGAAGATAT GAGAG	TGCCAAATTAC CCATAGAAAT	TCTACTAGAAGTCTGAAGATATGAGAGatctacttttttttgtaatgtgagaaatagatattgaat atgcctttcaaattagtttttgtatttatttccagtttgaatctttctgtaacttcctttaaga aaattgtctacagagagtatgaaccat[a/t]ttttaagaaagaaaaaccacaatctaccatttc aggtaagcctgaaatatacttttttaattttaaagataaATTTCTATGGGTAATTTGGCA	255
F7d10	F7	G	A	-	-	noncoding	GE293	ACCCTTGGAGG CAGAGAAC	AAAACCCTCCT GGTGGATG	ACCCTTGGAGGCAGAGAACtttgcccgtcagtcccatggggaatgtcaacaggcaggggcagcac tgcagagatttcatcatggtctcccaggccctcaggctcctctgccttctgcttgggcttcaggg ctgcctggctgcaggtgcgtcc[g/a]gggaggttttctccataaacttggtggaagggcagtgg gcaaatccaggagccagcccgggcttcccaaaccccgccttgctccggacaccccCATCCACCA GGAGGGTTTT	270
F7d11	F7	C	T	D	D	cds	GE354	GCAGAACACCA CTGCTGACC	CGTCTTTTGTC CAGTAAGATAA TCC	GCAGAACACCACTGCTGACCcaggggcatggccaccccgggggctggcgtctcgctgaccccag aagcccctctcagggtgtcccctttcctgtccccagacaaggatgaccagctgatctgtgtgaacg agaacggcggctgtgagcagtactgcagtgaccacacgggcaccaagcgctcctgtcggtgccac gaggggtactctctgctggcaga[c/t]ggggtgtcctgcacacccacaggtgaccaggcttcat gtcccagtcccagatgacaccagtccctgtcccactaGGATTATCTTACTGGACAAAAGACG	322
F7d12	F7	G	A	-	-	noncoding	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctga[g/a]gggggcttcttccttccaggcgagcacgacctcagcgagcacgacggg gatgagcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaa ccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctct gcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggc tggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggct gatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtaca tgttctgtgccggctactcggatggcagcaaggactcctgcaaggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787
F7u1	F7	C	T	H	H	cds	GE354	GCAGAACACCA CTGCTGACC	CGTCTTTTGTC CAGTAAGATAA TCC	GCAGAACACCACTGCTGACCcaggggcatggccaccccgggggctggcgtctcgctgaccccag aagcccctctcagggtgtcccctttcctgtccccagacaaggatgaccagctgatctgtgtgaacg agaacggcggctgtgagcagtactgcagtgaccacacgggcaccaagcgctcctgtcggtgcca[c/t]gaggggtactctctgctggcagacggggtgtcctgcacacccacaggtgaccaggcttcat gtcccagtcccagatgacaccagtccctgtcccactaGGATTATCTTACTGGACAAAAGACG	322
F7u2	F7	G	T	G	G	cds	GE296	TGTTTCTGAAT CTTTCCTAGTG G	CAGAGCTGTTG TTCACATTCAA	TGTTTCTGAATCTTTCCTAGTGGcacgttcatccctcacaaatctctgcatctttctgacttttg ttttacacagttgaatatccatgtggaaaaatacctattctagaaaaaagaaatgccagcaaacc ccaaggccgaattgtgggggggcaaggtgtgccccaaagg[g/t]gagtgtccatggcaggtaagg cttcccctggcttcaggattccaagccctgagggtcttgaagccttTTGAATGTGAACAACAGCT CTG	263

FIG. 5FFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F7u3	F7	G	T	G	V	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccac gacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcct gcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggg gccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatg acccaggactgcctgcagcagtcacggaaggtgg[g/t]agactccccaaatatcacggagtaca tgttctgtgccggctactcggatggcagcaaggactcctgcaaggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787
F7u4	F7	C	A	D	E	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccac gacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcct gcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggg gccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatg acccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgtt ctgtgccggctactcggatggcagcaagga[c/a]tcctgcaaggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787
F7u5	F7	C	T	T	T	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcac[c/t]accaa ccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctct gcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggc tggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggct gatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtaca tgttctgtgccggctactcggatggcagcaaggactcctgcaaggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787

FIG. 5GGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
F7u6	F7	A	T	E	V	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	787 agcccatccccatgcaccaggggtgaggtggcaggtggtg ccttccaggcgagcacgacctcagcgagcacgacggggatg tcatcatccccagcacgtacgtcccgggcaccaccaaccac cagccgtggtcctcactgaccatggtgccccctctgcct lgaggacgctggccttcgtgcgcttctcattggtcagcggc gccacggccctggagctcatggtcctcaacgtgccccggct gtcacggaaggtgggagactccccaaatatcaggagtaca gcagcaaggactcctgcaggggacagtggaggcccacat tacctgacgggcatcgtcagctgggccaggctgcgcaac cagggtcttccagtacatcgagtggctgcaaagctcatgc tcctgcgagccccatttccctagcccagccctggcctg gaactgtcctggcaccaaatcccatATTCTTCTGCAGTT
F7u7	F7	C	T	A	A	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	787 CCCTGCAGACCTAGAAATGGccacagcc gaaagggcctgagggggctttcttcctt agcagagccggcgggtggcgcaggtcat gacatcgcgctgctccgcctgcaccagc gcccgaacggacgttcttctgagaggacg gccagctgctggaccgtggcgccacggc acccaggactgcctgcagcagtcacgga ctgtgc[c/t]ggctactcggatggcag gccacccactaccgggccacgtggtacc cgtgggccactttgggtgtacaccagg gctcagagccacgcccaggagtcctct tggagagaaagccaaggctgcgtcgaac AATGGGG
F7u8	F7	T	A	V	D	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	787 agcccatccccatgcaccaggggtgaggtggcaggtggtg ccttccaggcgagcacgacctcagcgagcacgacggggatg tcatcatccccagcacgtacg[t/a]cccggcaccaccaa gcaccagcccgtggtccctcactgaccatggtggtgccctct agaggacgctggccttcgtgcgcttctcattggtcagcggc tggggccagctgctggaccgtggcgccacggcca gatgacccaggactgcctgcagcagtca tgttctgtgccggctactcggatggcag gccacccactaccgggccacgtggtacc cgtgggccactttgggtgtacaccagg gctcagagccacgcccaggagtcctct tggagagaaagccaaggctgcgtcgaac AATGGGG

FIG. 5HHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F7u9	F7	G	A	R	Q	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccac gacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgccccctctgcct gcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggg gccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatg acccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgtt ctgtgccggctactcggatggcagcaaggactcctgcaaggggacagtggaggcccacatgcca cccactacc[g/a]gggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787
F9d8	F9	G	T	-	-	noncoding	GE338	TTCAGATGCAG AGCATAGAATA GA	TGGACTGATCT TTCTGAGTCCT T	TTCAGATGCAGAGCATAGAATAGAaaatctttaaaaagacacttctctttaaaattttaaagcat ccatatatatttatgtat[g/t]ttaaatgttataaaagataggaaatcaataccaaaacacttt agatattaccgttaatttgtcttctttttattctttatagactgaattttggaagcagtatgttgg taagcaattcatttttatcctctagctaatatatgaaacatatgagaattatgtgggtttttttctc tgcataaatagataatatattaaactttgtcaaAAGGACTCAGAAAGATCAGTCCA	316
F9u1	F9	G	A	A	T	cds	GE364	GGCCTCAATCT CAATTTTTGTA AT	AATAGCCTCAG TCTCCCACCT	GGCCTCAATCTCAATTTTTGTAATacatgttccatttgccaatgagaaatatcaggttactaatt tttcttctatttttctagtgccatttccatgtggaagagtttctgtttcacaaacttctaagctc acccgtgctgag[g/a]ctgtttttcctgatgtggactatgtaaattctactgaagctgaaacca ttttggataacatcactcaaagcacccaatcatttaatgacttcactcgggttgttggtggagaa gatgccaaaccaggtcaattcccttggcaggtactttatactgatggtgtgtcaaaactggagct cagctggcaagacacaggccAGGTGGGAGACTGAGGCTATT	366
F9u2	F9	A	T	K	N	cds	GE342	TTTTGCCTATT CCTGTAACCAG	GCCCAATTTAT TCAACAACAAT	TTTTGCCTATTCCTGTAACCAGcacacatatttatttttttctagatcaaatgtattatgcagta agagtcttaattttgttttcacaggttgttttgaatggtaa[a/t]gttgatgcattctgtggag gctctatcgttaatgaaaaatggattgtaactgctgcccactgtgttgaaactggtgttaaaatt acagttgtcgcaggtaaatacacagaaagaataataatctgcagcaccactagctctttaatatg attggtacaccatattttactaaggtctaataaaATTGTTGTTGAATAAATTGGGC	316
F9u3	F9	G	T	R	R	cds	GE364	GGCCTCAATCT CAATTTTTGTA AT	AATAGCCTCAG TCTCCCACCT	GGCCTCAATCTCAATTTTTGTAATacatgttccatttgccaatgagaaatatcaggttactaatt tttcttctatttttctagtgccatttccatgtggaagagtttctgtttcacaaacttctaagctc acccgtgctgaggctgtttttcctgatgtggactatgtaaattctactgaagctgaaaccatttt ggataacatcactcaaagcacccaatcatttaatgacttcactcg[g/t]gttgttggtggagaa gatgccaaaccaggtcaattcccttggcaggtactttatactgatggtgtgtcaaaactggagct cagctggcaagacacaggccAGGTGGGAGACTGAGGCTATT	366
F9u4	F9	A	G	-	-	noncoding	GE303	CAATGAGTATC TACAGGGGAGG A	CACCAATATTG CATTTTCCAGT	CAATGAGTATCTACAGGGGAGGAccgggcattctaagcagtttacgtgccaattcaatttcttaa cctatctcaaagatggagatcagtgtgagtccaatccatgtttaaatggcggcagttgcaaggat gacattaattcctatgaatgttggtgtccctttggatttgaaggaaagaactgtgaattaggtaa gt[a/g]actatttttttgaatactcatggttcaaagtttccctctgaaacaagttgaaACTGGAA AATGCAATATTGGTG	275

FIG. 5III

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F9u5	F9	A	G	E	G	cds	GE403	TGGTCCCAAGT AGTCACTTAGA AAAT	TCTAACAAAAG ATGGGAAAGTG AT	TGGTCCCAAGTAGTCACTTAGAAAATctgtgtatgtgaaatactgtttgtgacttaaaatgaaat ttatttttaataggtgaacataatattgaggagacagaacatacag[a/g]gcaaaagcgaaatg tgattcgagcaattattcctcaccacaactacaatgcagctattaataagtacaaccatgacatt gccctttctggaactggacgaacccttagtgctaaacagctacgttacacctatttgcattgctga caaggaatacacgaacatcttcctcaaatttggatctggctatgtaagtggctggggaagagtct tccacaaagggagatcagctttagttcttcagtaccttagagttccacttgttgaccgagccaca tgtcttcgatctacaaagttcaccatctataacaacatgttctgtgctggcttccatgaaggagg tagagattcatgtcaaggagatagtgggggacccccatgttactgaagtggaagggaccagtttct taactggaattattagctggggtgaagagtgtgcaatgaaaggcaaatatggaatatataccaag gtatcccggtatgtcaactggattaaggaaaaaacaaagctcacttaatgaaagatggatttcca aggttaattcattggaattgaaaattaacagggcctctcactaactaATCACTTTCCCATCTTTT GTTAGA	721
F9u6	F9	G	T	K	N	cds	GE340	CCCATACATGA GTCAGTAGTTC CAT	AGGAAGCAGAT TCAAGTAGGAA T	CCCATACATGAGTCAGTAGTTCCATgtacttttagaaatgcatgttaaatgatgctgttactgt ctattttgcttctttttagatgtaacatgtaacattaagaatggcagatgcgagcagttttgtaaa aatagtgctgataacaaggtggtttgctcctgtactgagggatatcgacttgcagaaaaccagaa [g/t]tcctgtgaaccagcaggtcataatctgaataagatttttaaagaaaatctgtatctgaa acttcagcattttaacaaacctacataattttaATTCCTACTTGAATCTGCTTCCT	316
F9u7	F9	A	T	E	V	cds	GE398	GGCTTTCAGAT TATTTGGATTA AAAAC	TGCTTACCAAC ATACTGCTTCC	GGCTTTCAGATTATTTGGATTAAAAACaaagactttcttaagagatgtaaaattttcatgatgtt ttctttttttgctaaaactaaagaattattcttttacatttcagtttttcttgatcatgaaaacgc caacaaaattctgaatcggccaaagaggtataattcaggtaaattggaag[a/t]gtttgttcaa gggaaccttgagagagaatgtatggaagaaaagtgtagttttgaagaagcacgagaagtttttga aaacactgaaagaacagtgagtatttccacataataccccttcagatgcagagcatagaatagaaa atctttaaaaagacacttctctttaaaattttaaagcatccatatatatttatgtatgttaaatg ttataaaagataggaaatcaataccaaaacactttagatattaccgttaatttgtcttcttttat tctttatagactgaattttGGAAGCAGTATGTTGGTAAGCA	496
FGAd13	FGA	T	C	-	-	noncoding	GE377	AAACTGTAACC AAAATAAAATT AGGC	AGTGCATAACT ATCGCCTTCC	AAACTGTAACCAAAATAAAATTAGGCatatttacaagctagtttctttctttctttttttctcttt ctttctttctttctttctttctttctttctttctttctttctttctttctttctccttccttccttttct tccttttctttttgctggcaattacagacaaatcactcagcagctacttcaataaccatattttc gatttcagaccgtgataatacctacaaccgagtgtcagaggatctgagaagcagaattgaagtcc tgaagcgcaaagtcatagaaaaagtacagcatatccagcttctgcagaaaaatgttagagctcag ttggttgatatgaaacgactggaggtaagtatgtggctgtggtcccgagtgtccttgttt[t/c] tgagtagagggaaaaGGAAGGCGATAGTTATGCACT	426
FGAu1	FGA	A	G	D	G	cds	GE377	AAACTGTAACC AAAATAAAATT AGGC	AGTGCATAACT ATCGCCTTCC	AAACTGTAACCAAAATAAAATTAGGCatatttacaagctagtttctttctttctttttttctcttt ctttctttctttctttctttctttctttctttctttctttctttctttctttctccttccttccttttct tccttttctttttgctggcaattacagacaaatcactcagcagctacttcaataaccatattttc gatttcagaccgtgataatacctacaaccgagtgtcagaggatctgagaagcagaattgaagtcc tgaagcgcaaagtcatagaaaaagtacagcatatccagcttctgcagaaaaatgttagagctcag ttggttg[a/g]tatgaaacgactggaggtaagtatgtggctgtggtcccgagtgtccttgtttt tgagtagagggaaaaGGAAGGCGATAGTTATGCACT	426

67/178

FIG. 5JJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu10	FGA	G	C	A	P	cds	GE414	GAGGCCTAACA ACCCAGACT	AAAAAGTGTAG TTTCAATGACG TGTAA	GAGGCCTAACAACCCAGACTggggcacatttgaagaggtgtcaggaaatgtaagtccagggacaa ggagagagtaccacacagaaaaactggtcacttctaaaggagataaagagctcaggactggtaaa gagaaggtcacctctggtagcacaaccaccacgcgtcgttcatgctctaaaaccgttactaagac tgttattggtcctgatggtcacaaagaagttaccaaagaagtggtgacctccgaagatggttctg actgtcccgaggcaatggatttaggcacattgtctggcataggtactctggatgggttccgccat aggcaccctgatgaa[g/c]ctgccttcttcgacactgcctcaactggaaaaacattcccaggtt tcttctcacctatgttaggagagtttgtcagtgagactgagtctaggggctcagaatctggcatc ttcacaaatacaaaggaatccagttctcatcaccctgggatagctgaattcccttcccgtggtaa atcttcaagttacagcaaacaatttactagtagcacgagttacaacagaggagactccacatttg aaagcaagagctataaaatggcagatgaggccggaagtgaagccgatcatgaaggaacacatagc accaagagaggccatgctaaatctcgccctgtcagaggtatccacacttctccttttggggaagcc ttccctgtccccctagactaagttaaatatttctgcacagtgttcccatggccccttgcatttcc ttcttaactctctgTTACACGTCATTGAAACTACACTTTTT	821
FGAu11	FGA	G	A	G	E	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacctgga atcctggcagctctgaacgcggaagtgctg[g/a]gcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu12	FGA	T	A	S	T	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacctgga atcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgta[t/a]ctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825

FIG. 5KKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu2	FGA	A	T	G	G	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccgg[a/t]aattttaagagccagcttcagaaggtacccccagagtggaaggcatt aacagacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggag gctccacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagc tggaactctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactgg agggactgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu3	FGA	A	T	M	L	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaa[a/t]tgaaaccagtt ccagacttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcatt aacagacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggag gctccacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagc tggaactctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactgg agggactgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu4	FGA	A	G	T	A	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagt[a/g]ctggaagctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825

FIG. 5LLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu5	FGA	A	G	R	G	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccct[a/g]gacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu6	FGA	C	T	T	T	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtac[c/t]ggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu7	FGA	A	G	K	E	cds	GE414	GAGGCCTAACA ACCCAGACT	AAAAAGTGTAG TTTCAATGACG TGTAA	GAGGCCTAACAACCCAGACTggggcacatttgaagaggtgtcaggaaatgtaagtccagggacaa ggagagagtaccacacagaaaaactggtcacttctaaaggagataaagagctcaggactggt[a/ g]aagagaaggtcacctctggtagcacaaccaccacgcgtcgttcatgctctaaaaccgttacta agactgttattggtcctgatggtcacaaagaagttaccaaagaagtggtgacctccgaagatggt tctgactgtcccgaggcaatggatttaggcacattgtctggcataggtactctggatgggttccg ccataggcaccctgatgaagctgccttcttcgacactgcctcaactggaaaaacattcccaggtt tcttctcacctatgttaggagagtttgtcagtgagactgagtctaggggctcagaatctggcatc ttcacaaatacaaaggaatccagttctcatcaccctgggatagctgaattcccttcccgtggtaa atcttcaagttacagcaaacaatttactagtagcacgagttacaacagaggagactccacatttg aaagcaagagctataaaatggcagatgaggccggaagtgaagccgatcatgaaggaacacatagc accaagagaggccatgctaaatctcgccctgtcagaggtatccacacttctcctttggggaagcc ttcccctgtccccctagactaagttaaatatttctgcacagtgttcccatggccccttgcatttcc ttcttaactctctgTTACACGTCATTGAAACTACACTTTTT	821

FIG. 5MMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu8	FGA	T	C	P	P	cds	GE414	GAGGCCTAACA ACCCAGACT	AAAAAGTGTAG TTTCAATGACG TGTAA	GAGGCCTAACAACCCAGACTggggcacatttgaagaggtgtcaggaaatgtaagtccagggacaa ggagagagtaccacacagaaaaactggtcacttctaaaggagataaagagctcaggactggtaaa gagaaggtcacctctggtagcacaaccaccacgcgtcgttcatgctctaaaaccgttactaagac tgttattggtcctgatggtcacaaagaagttaccaaagaagtggtgacctccgaagatggttctg actgtcccgaggcaatggatttaggcacattgtctggcataggtactctggatgggttccgccat aggcaccc[t/c]gatgaagctgccttcttcgacactgcctcaactggaaaaacattcccaggtt tcttctcacctatgttaggagagtttgtcagtgagactgagtctaggggctcagaatctggcatc ttcacaaatacaaaggaatccagttctcatcaccctgggatagctgaattcccttcccgtggtaa atcttcaagttacagcaaacaatttactagtagcacgagttacaacagaggagactccacatttg aaagcaagagctataaaatggcagatgaggccggaagtgaagccgatcatgaaggaacacatagc accaagagaggccatgctaaatctcgccctgtcagaggtatccacacttctcctttggggaagcc ttccctgtccccctagactaagttaaatatttctgcacagtgttcccatggcccattgcatttcc ttcttaactctctgTTACACGTCATTGAAACTACACTTTTT	821
FGAu9	FGA	G	C	S	T	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacattttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaa[g/c]ctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGBd12	FGB	T	A	-	-	noncoding	GE336	GTAACCATTTC TGAAGTCATTC CT	CAATTCCATTT CATAACTATAA GCAA	GTAACCATTTCTGAAGTCATTCCTagcagaggac[t/a]cagatatatataggattgaagatctc tcaagttaagtctacatgaaaaggatggtttcttggagcttccacaaacttaaaaccatgaaaca tctattattgctactattgtgtgtttttctagttaagtcccaaggtgtcaacgacaatgaggagg tgaatttttaaagcattattatattattagtagtattattaatataagatgtaacataatcata ttatgtgcttattttaatgaaattagcaTTGCTTATAGTTATGAAATGGAATTG	314
FGBd13	FGB	A	G	K	E	cds	GE336	GTAACCATTTC TGAAGTCATTC CT	CAATTCCATTT CATAACTATAA GCAA	GTAACCATTTCTGAAGTCATTCCTagcagaggactcagatatatataggattgaagatctctcaa gttaagtctacatg[a/g]aaaggatggtttcttggagcttccacaaacttaaaaccatgaaaca tctattattgctactattgtgtgtttttctagttaagtcccaaggtgtcaacgacaatgaggagg tgaatttttaaagcattattatattattagtagtattattaatataagatgtaacataatcata ttatgtgcttattttaatgaaattagcaTTGCTTATAGTTATGAAATGGAATTG	314
FGBd14	FGB	T	A	-	-	noncoding	GE336	GTAACCATTTC TGAAGTCATTC CT	CAATTCCATTT CATAACTATAA GCAA	GTAACCATTTCTGAAGTCATTCCTagcagaggactcagatatatataggattgaagatctctcaa gttaagtctacatgaaaaggatggtttcttggagcttccacaaacttaaaaccatgaaacatcta ttattgctactattgtgtgtttttctagttaagtcccaaggtgtcaacgacaatgaggaggtgaa ttttttaaagcattattata[t/a]tattagtagtattattaatataagatgtaacataatcata ttatgtgcttattttaatgaaattagcaTTGCTTATAGTTATGAAATGGAATTG	314

FIG. 5NNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGBd15	FGB	C	T	P	L	cds	GE350	TTTCAAAGGTC TATAATAACAC ACTCC	ACACCTGGCCT TGTTTCCTG	TTTCAAAGGTCTATAATAACACACTCCttagtaacttatgtaatgttatttttaaagaattggtga ctaaatacaaagtaattatgtcataaacccctgaacataatgttgtcttacatttgcagaatgtg aggaaattatcaggaaaggaggtgaaacatctgaaatgtatctcattcaacctgacagttctgtc aaaac[c/t]gtatagagtatactgtgacatgaatacagaaaatggaggtaagctttcgacagttg ttgacctgttgatctgtaattatttggataccgtaaaatgcCAGGAAACAAGGCCAGGTGT	321
FGBd16	FGB	T	C	C	C	cds	GE351	CGCTGAATTTT CCTATGTGCTA TT	TGCATTCTCGT GGCAGTCTA	CGCTGAATTTTCCTATGTGCTATTttaacaaatgtccatgacccaaatccttcatctaatgcctg ctattttctttgtttttaggggtgttgtg[t/c]cctacaggatgtcagttgcaagaggctttg ctacaacaggaaaggccaatcagaaatagtgttgatgagttaaataacaatgtggaagctgtttc ccagacctcctcttcttcctttcagtacatgtatttgctgaaagacctgtggcaaaagaggcaga agcaagtaaaaggtagatatccttgtgctttccattcgattttcagctataaaattggaaccgtT AGACTGCCACGAGAATGCA	344
FGBd17	FGB	T	A	-	-	noncoding	GE392	AAGGGAAGAAA GGCAGTTTT	CCCAGGAAGTG GTAGCTATTAA A	AAGGGAAGAAAGGCAGTTTTtagtttcccaaaattttatttttggtgagagattttattt[t/a] gtttttctttaggtgaatattggcttggaaatgataaaattagccagcttaccaggatgggacc cacagaacttttgatagaaatggaggactggaaaggagacaaagtaaaggctcactatggaggat tcactgtacagaatgaagccaacaaataccagatctcagtgaacaaatacagaggaacagccggt aatgccctcatggatggagcatctcagctgatgggagaaaacaggaccatgaccattcacaacgg catgttcttcagcacgtatgacagagacaatgacggctggtatgtgtggcactctttgctcctgc tttaaaaatcacactaatatcattactcagaatcattaacaatatttTTTAATAGCTACCACTTCC TGGG	459
FGBu1	FGB	C	T	S	S	cds	GE390	TCATAACTGCT TGGTGATAGCT C	CCACTTAGCAT TTTTGTTGTTG	TCATAACTGCTTGGTGATAGCTCagtgtttaatagtttattctcagaaaatcaaaattgtatagt taaatacattagttttatgaggcaaaaatgctaactatttctacataatttcatttttccagata atgaaaatgtagtcaatgagtactcctcagaactggaaaagcaccaattatatatagatgagact gtgaatag[c/t]aatatcccaactaaccttcgtgtgcttcgttcaatcctggaaaacctgagaa gcaaaatacaaaagttagaatctgatgtctcagctcaaatggaatattgtcgcaccccatgcact gtcagttgcaatattcctgtggtgtctggcaaaggtaactgattcataaacatatttttagagag ttccagaagaactcacacaccaaaaataagagaacaacaaCAACAACAAAAATGCTAAGTGG	452
FGBu10	FGB	G	T	S	I	cds	GE351	CGCTGAATTTT CCTATGTGCTA TT	TGCATTCTCGT GGCAGTCTA	CGCTGAATTTTCCTATGTGCTATTttaacaaatgtccatgacccaaatccttcatctaatgcctg ctattttctttgtttttaggggtgttgtgtcctacaggatgtcagttgcaagaggctttgctac aacaggaaaggccaatcagaaata[g/t]tgttgatgagttaaataacaatgtggaagctgtttc ccagacctcctcttcttcctttcagtacatgtatttgctgaaagacctgtggcaaaagaggcaga agcaagtaaaaggtagatatccttgtgctttccattcgattttcagctataaaattggaaccgtT AGACTGCCACGAGAATGCA	344
FGBu11	FGB	A	G	S	S	cds	GE392	AAGGGAAGAAA GGCAGTTTT	CCCAGGAAGTG GTAGCTATTAA A	AAGGGAAGAAAGGCAGTTTTtagtttcccaaaattttatttttggtgagagattttattttgttt ttcttttaggtgaatattggcttggaaatgataaaattagccagcttaccaggatgggacccaca gaacttttgatagaaatggaggactggaaaggagacaaagtaaaggctcactatggaggattcac tgtacagaatgaagccaacaaataccagatctc[a/g]gtgaacaaatacagaggaacagccggt aatgccctcatggatggagcatctcagctgatgggagaaaacaggaccatgaccattcacaacgg catgttcttcagcacgtatgacagagacaatgacggctggtatgtgtggcactctttgctcctgc tttaaaaatcacactaatatcattactcagaatcattaacaatatttTTTAATAGCTACCACTTCC TGGG	459

FIG. 5000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGBu2	FGB	A	T	E	V	cds	GE390	TCATAACTGCT TGGTGATAGCT C	CCACTTAGCAT TTTTGTTGTTG	TCATAACTGCTTGGTGATAGCTCagtgtttaatagtttattctcagaaaatcaaaattgtatagt taaatacattagttttatgaggcaaaaatgctaactatttctacataatttcatttttccagata atg[a/t]aaatgtagtcaatgagtactcctcagaactggaaaagcaccaattatatatagatga gactgtgaatagcaatatcccaactaaccttcgtgtgcttcgttcaatcctggaaaacctgagaa gcaaaatacaaaagttagaatctgatgtctcagctcaaatggaatattgtcgcaccccatgcact gtcagttgcaatattcctgtggtgtctggcaaaggtaactgattcataaacatatttttagagag ttccagaagaactcacacaccaaaaataagagaacaacaaCAACAACAAAAATGCTAAGTGG	452
FGBu3	FGB	G	T	V	V	cds	GE330	GGGATTCAGAT ATTATTTTCAA AGTG	GCTTCCAACAA TGAATGTTTTT	GGGATTCAGATATTATTTTCAAAGTGacattatttgctgttggttaatatatgctctttttgttt ctgtcaaccaaaggatggacagt[g/t]attcagaaccgtcaagacggtagtgttgactttggca ggaaatgggatccatataaacagggatttggaaatgttgcaaccaacacagatgggaagaattac tgtggcctaccaggtaacgaacaggcatgcaaaataaaatcattctatttgaaatgggatttttt ttaattaAAAAACATTCATTGTTGGAAGC	289
FGBu4	FGB	G	A	R	K	cds	GE382	ATGGGTAATCT GCAAAACGTA	TCAAAAAGTCA CACTCACGTCT G	ATGGGTAATCTGCAAAACGTAacttgaccaccgtagttctgtttctaataacgccaaacacattt tctttcaggttaacatcagatcccagaaaacagtgttctaaagaagacggtggtggatggtggta taatagatgtcatgcagccaatccaaacggcagatactactggggtggacagtacacctgggaca tggcaaagcatggcacagatgatggtgtagtatggatgaattggaaggggtcatggtactcaatg a[g/a]gaagatgagtatgaagatcaggcccttcttcccacagcaatagtccccaatacgtagat ttttgctcttctgtatgtgacaacatttttgtacattatgttattggaattttctttcatacatt atattcctctaaaactctcaagCAGACGTGAGTGTGACTTTTTGA	435
FGBu5	FGB	T	A	G	G	cds	GE477	GAATAGTTACA TTCCAAATCTT CTA	TGACTACAGGC TTTCTCTGCAT	GAATAGTTACATTCCAAATCTTCTAtaacactctgtattatatttctgcctcattccttgtaggg tttcttcagtgcccgtgg[t/a]catcgacccttgacaagaagagagaagaggctcccagcctg aggcctgccccaccgcccatcagtggaggtggctatcgggctcgtccagccaaagcagctgccac tcaaaagaaagtagaaagaaaagcccctgatgctggaggctgtcttcacgctgacccagacctgg tgggtgcactgatgtttcttgcagtggtggctctctcATGCAGAGAAAGCCTGTAGTCA	319
FGBu6	FGB	A	T	A	A	cds	GE330	GGGATTCAGAT ATTATTTTCAA AGTG	GCTTCCAACAA TGAATGTTTTT	GGGATTCAGATATTATTTTCAAAGTGacattatttgctgttggttaatatatgctctttttgttt ctgtcaaccaaaggatggacagtgattcagaaccgtcaagacggtagtgttgactttggcaggaa atgggatccatataaacagggatttggaaatgttgc[a/t]accaacacagatgggaagaattac tgtggcctaccaggtaacgaacaggcatgcaaaataaaatcattctatttgaaatgggatttttt ttaattaAAAAACATTCATTGTTGGAAGC	289
FGBu7	FGB	A	G	R	R	cds	GE477	GAATAGTTACA TTCCAAATCTT CTA	TGACTACAGGC TTTCTCTGCAT	GAATAGTTACATTCCAAATCTTCTAtaacactctgtattatatttctgcctcattccttgtaggg tttcttcagtgcccgtggtcatcg[a/g]ccccttgacaagaagagagaagaggctcccagcctg aggcctgccccaccgcccatcagtggaggtggctatcgggctcgtccagccaaagcagctgccac tcaaaagaaagtagaaagaaaagcccctgatgctggaggctgtcttcacgctgacccagacctgg tgggtgcactgatgtttcttgcagtggtggctctctcATGCAGAGAAAGCCTGTAGTCA	319
FGBu8	FGB	C	T	H	H	cds	GE477	GAATAGTTACA TTCCAAATCTT CTA	TGACTACAGGC TTTCTCTGCAT	GAATAGTTACATTCCAAATCTTCTAtaacactctgtattatatttctgcctcattccttgtaggg tttcttcagtgcccgtggtcatcgacccccttgacaagaagagagaagaggctcccagcctgaggc ctgccccaccgcccatcagtggaggtggctatcgggctcgtccagccaaagcagctgccactcaa aagaaagtagaaagaaaagcccctgatgctggaggctgtcttca[c/t]gctgacccagacctgg tgggtgcactgatgtttcttgcagtggtggctctctcATGCAGAGAAAGCCTGTAGTCA	319

FIG. 5PPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGBu9	FGB	C	T	Y	Y	cds	GE392	AAGGGAAGAAAGGCAGTTTT	CCCAGGAAGTGGTAGCTATTAAA	AAGGGAAGAAAGGCAGTTTTtagtttcccaaaattttatttttggtgagagattttatttgtttttcttttaggtgaatattggcttggaaatgataaaattagccagcttaccaggatgggacccacagaacttttgatagaaatggaggactggaaaggagacaaagtaaaggctcactatggaggattcactgtacagaatgaagccaacaaataccagatctcagtgaacaaata[c/t]agaggaacagccggtaatgccctcatggatggagcatctcagctgatgggagaaaacaggaccatgaccattcacaacggcatgttcttcagcacgtatgacagagacaatgacggctggtatgtgtggcactctttgctcctgctttaaaaatcacactaatatcattactcagaatcattaacaatatttTTTAATAGCTACCACTTCCTGGG	459
FGGd3	FGG	A	G	M	V	cds	GE337	TTCGTAATAGAACAGCTCTTCATAGACT	GCAGTTAATTTTCTACAAATCATCC	TTCGTAATAGACAGCTCTTCATAGACTtgcagaggtaaaaagattccagaataatgatatgtacatctacgacttgttttaggtggcacttactcaaaagcatctactcctaatggttatgataatggcattatttgggccacttggaaaacccggtggtattccatgaagaaaaccact[a/g]tgaagataatcccattcaacagactcacaattggagaaggacagcaacaccacctgggggagccaaacaggtcagaccagagcaccctgcggaaacagaatatgactcactttaccctgaGGATGATTTGTAGAAAATTAACTGC	331
FGGd4	FGG	A	G	-	-	noncoding	GE349	AAAATACTTAGCAGTTTCCAAAGAAAA	TGGGTAGCCACTTTCTAAACTATTC	AAAATACTTAGCAGTTTCCAAAGAAAAtataaaattactcttctgaaaggaatacttatttttgtcttcttatttttgttatcttatgtttctgtttgtagatatttgcaggaaatatataattcaaataatcaaaagattgttaacctgaaagagaaggtagcccagcttgaagcacagtgccaggaaccttgcaaagacacggtgcaaatccatgatatcactgggaaaggtaactgatgaaggttatattgggattaggttcatcaaagtaagtaatgtaaaggagaaagtatgtactgg[a/g]aagtatagGAATAGTTTAGAAAGTGGCTACCCA	341
FGGd5	FGG	G	A	G	R	cds	GE360	TGCTGATGTGAAAAGTAAGAAAAT	CAAGGTGCTTAGAAAAGTATCTGC	TGCTGATGTGAAAAGTAAGAAAATtattcttggaaaatgaatagtttactacatgttaaaagctatttttcaaggctggcacagtcttacctgcatttcaaaccacagtaaaagtcgattctccttctctagattgtcaagacattgccaataagggagctaaacagagc[g/a]ggctttacttttattaaacctctgaaagctaaccagcaattcttagtctactgtgaaatcgatgggtctggaaatggatggactgtgtttcagaaggtaatttttttccccaccatgtgtatttaataaattcctacattgtttctgccatatgGCAGATACTTTTCTAAGCACCTTG	351
FGGd6	FGG	T	A	-	-	noncoding	GE372	GAACCAGTGCTCTGTATTTTTGAC	CCATTGTCTATTGATAGTTGGAAAG	GAACCAGTGCTCTGTATTTTTGACaaaatgttgacagcattctctttaca[t/a]gcattgatagtctatttttctccttttgctcttgcaaatgtgtaattagagacttgatggcagtgtagatttcaagaaaaactggattcaatataaagaaggatttggacatctgtctcctactggcacaacagaattttggctgggaaatgagaagattcatttgataagcacacagtctgccatcccatatgcattaagagtggaactggaagactggaatggcagaaccaggtactgttttgaaatgacttccaacttttattgtaaagattgcctggaatgtgcaCTTTCCAACTATCAATAGACAATGG	369
FGGu1	FGG	A	T	Y	F	cds	GE404	CATCCTACGAAAGAGGGAACTT	TCCACTTCCAGTTTCAAAGAACT	CATCCTACGAAAGAGGGAACTTctgagatccctgaggagggtcagcatgtgatggttgtatttcctttcttctcagtactgcagact[a/t]tgccatgttcaaggtgggacctgaagctgacaagtaccgcctaacatatgcctacttcgctggtggggatgctggagatgcctttgatggctttgattttggcgatgatcctagtgacaagtttttcacatcccataatggcatgcagttcagtacctgggacaatgacaatgataagtttgaaggcaactgtgctgaacaggatggatctggttggtggatgaacaagtgtcacgctggccatctcaatggagtttattaccaaggtatgttttccttttcttagattccaagttaatgtatagtgtatactatttttcataaaaaaataataaatagatatgaagaaatgaagaataatttataaagatagtagggatttatcatgttctttatttcaactaAGTTCTTTGAAACTGGAAGTGGA	516

FIG. 5QQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGGu2	FGG	A	C	I	I	cds	GE372	GAACCAGTGCT CTGTATTTTTG AC	CCATTGTCTAT TGATAGTTGGA AAG	GAACCAGTGCTCTGTATTTTTGACaaaatgttgacagcattctctttacatgcattgatagtcta ttttctccttttgctcttgcaaatgtgtaattagagacttgatggcagtgtagatttcaagaaaa actggattcaatataaagaaggatttggacatctgtctcctactggcacaacagaatttlggctg ggaaatgagaagattcatttgat[a/c]agcacacagtctgccatcccatatgcattaagagtgg aactggaagactggaatggcagaaccaggtactgttttgaaatgacttccaacttttattgtaa agattgcctggaatgtgcaCTTTCCAACTATCAATAGACAATGG	369
FSHRu1	FSHR	A	G	T	A	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag [a/g]ctaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttg acatgacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccct aagccagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatg gtttatcagcatcctggccatcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu2	FSHR	G	A	S	N	cds	GE648	GCCATGCTGCC AGTGTC	TGTTTTAGTTT TGGGCTAAAT	GCCATGCTGCCAGTGTCatggtgatgggctggatttttgcttttgcagctgccctctttcccatc tttggcatcagcagctacatgaaggtgagcatctgcctgcccatggatattgacagcccttgtc acagctgtatgtcatgtccctccttgtgctcaatgtcctggcctttgtggtcatctgtggctgct atatccacatctacctcacagtgcggaaccccaacatcgtgtcctcctctagtgacaccaggatc gccaagcgcatggccatgctcatcttcactgacttcctctgcatggcacccatttctttctttgc catttctgcctccctcaaggtgcccctcatcactgtgtccaaagcaaagattctgctggttctgt ttcaccccatcaactcctgtgccaacccccttcctctatgccatctttaccaaaaactttcgcaga gatttcttcattctgctgagcaagtgtggctgctatgaaatgcaagcccaaatttataggacaga aacttcatccactgtccacaacacccatccaaggaatggccactgctcttcagctcccagagtca cca[g/a]tggttccacttacatacttgtccctctaagtcATTTAGCCCAAAACTAAAACA	646
FSHRu3	FSHR	C	G	S	R	cds	GE648	GCCATGCTGCC AGTGTC	TGTTTTAGTTT TGGGCTAAAT	GCCATGCTGCCAGTGTCatggtgatgggctggatttttgcttttgcagctgccctctttcccatc tttggcatcagcagctacatgaaggtgagcatctgcctgcccatggatattgacag[c/g]cctt tgtcacagctgtatgtcatgtccctccttgtgctcaatgtcctggcctttgtggtcatctgtggc tgctatatccacatctacctcacagtgcggaaccccaacatcgtgtcctcctctagtgacaccag gatcgccaagcgcatggccatgctcatcttcactgacttcctctgcatggcacccatttctttct ttgccatttctgcctccctcaaggtgcccctcatcactgtgtccaaagcaaagattctgctggtt ctgtttcaccccatcaactcctgtgccaacccccttcctctatgccatctttaccaaaaactttcg cagagatttcttcattctgctgagcaagtgtggctgctatgaaatgcaagcccaaatttatagga cagaaacttcatccactgtccacaacacccatccaaggaatggccactgctcttcagctcccaga gtcaccagtggttccacttacatacttgtccctctaagtcATTTAGCCCAAAACTAAAACA	646

FIG. 5RRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FSHRu4	FSHR	T	G	F	V	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagagga[t/g]ttg acatgacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccct aagccagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatg gtttatcagcatcctggccatcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu5	FSHR	G	A	T	T	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttgacat gac[g/a]tacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccct aagccagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatg gtttatcagcatcctggccatcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu6	FSHR	A	C	I	L	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttgacat gacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccctaagc cagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatggttt atcagcatcctggcc[a/c]tcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu7	FSHR	A	G	T	A	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttgacat gacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccctaagc cagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatggttt atcagcatcctggccatc[a/g]ctgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHu1	FSH	T	C	Y	Y	cds	GE611	GGAACTTCCAC AATACCATAAC CTA	TTATTCTTTCA TTTCACCAAAG G	GGAACTTCCACAATACCATAACCTAactctcttcttaaactcctcaggatctggtgtataaggac ccagccaggcccaaaatccagaaaacatgtaccttcaaggaactggtata[t/c]gaaacagtga gagtgcccggctgtgctcaccatgcagattccttgtatacatacccagtggccacccagtgtcac tgtggcaagtgtgacagcgacagcactgattgtactgtgcgaggcctggggcccagctactgctC CTTTGGTGAAATGAAAGAATAA	282

FIG. 5SSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FSHu2	FSH	G	T	S	I	cds	GE561	TTTCTCAGTTT CTAGTGGGCTT C	GGTACCTACCC TGGTGTAGCA	TTTCTCAGTTTCTAGTGGGCTTCattgtttgcttcccagaccaggatgaagacactccagttttt cttcctttctgttgctggaaagcaatctgctgcaata[g/t]ctgtgagctgaccaacatcacc attgcaatagagaaagaagaatgtcgtttctgcataagcatcaacaccacttggtgtgctggcta cTGCTACACCAGGGTAGGTACC	217
GABRB1a7	GABRB1	A	G	-	-	noncoding	GE1089	CAGATGGTATT CAAAATGATTT CCTA	AACCATCTTCT TCCTTTCACAG	CAGATGGTATTCAAAATGATTTCCTAaactttgtttaaccgtgctgtttttattggtttcagatg gctataccactgatgacattgaattttactggaatggaggagaaggggcagtcactggtgttaat aaaatcgaacttcctcaattttcaattgttgactacaagatggtgtctaagaaggtggagttcac aacaggtgaggttgtttcccccaa[a/g]atgtactaggggtgCTGTGAAAGGAAGAAGATGGTT	260
GABRB1a8	GABRB1	C	A	I	I	cds	GE1271	AACATGATTTG GGGCTAGGA	TGCTAATTAAC TCAGTGAGAAG TTGAAT	AACATGATTTGGGGCTAGGAagcctggaaatgaaatgtcatcacttttgtaatgttttcttttttt ctctctcctctctatcagaatcacaaccacagctgcatgtatgatggatcttcgaagatatccac tggatgagcagaactgcaccctggagat[c/a]gaaagttgtgagttacttggacaggggaatga aaaagagggattcttctttgacccagttgaATTCAACTTCTCACTGAGTTAATTAGCA	253
GABRB1d3	GABRB1	G	A	-	-	noncoding	GE1035	CCAGCCTGCTG TCACTGAG	GTCCATTTCCC ATCTGCGTA	CCAGCCTGCTGTCACTGAGagaatctgttcctaatgtggcccacctcccc[g/a]gcagggcccc ccgtcgacgttgggatgcggatcgatgtcgccagcatagacatggtctccgaagtgaatatggtg agtggcctcccgaggggcccggcggttcggctTACGCAGATGGGAAATGGAC	182
GABRB1d4	GABRB1	C	T	I	I	cds	GE1089	CAGATGGTATT CAAAATGATTT CCTA	AACCATCTTCT TCCTTTCACAG	CAGATGGTATTCAAAATGATTTCCTAaactttgtttaaccgtgctgtttttattggtttcagatg gctataccactgatgacattgaattttactggaatggaggagaaggggcagtcactggtgttaat aaaat[c/t]gaacttcctcaattttcaattgttgactacaagatggtgtctaagaaggtggagt tcacaacaggtgaggttgtttcccccaaaatgtactaggggtgCTGTGAAAGGAAGAAGATGGTT	260
GABRB1d5	GABRB1	A	G	-	-	noncoding	GE1134	CCTCTCAATCT TGAAAAAGGA	GAGAGCCCGAG GCATCAT	CCTCTCAATCTTGAAAAAGGAacttaatagtggc[a/g]ccttcagctaagtgttgtctttctct ttcacaggaatcacgacggtgcttacaatgacaaccatcagcacccacctcagggagaccctgcc aaagatcccttatgtcaaagcgattgatatttatctgatgggttgctttgtgtttgtgttcctgg ctctgctggagtatgcctttgtaaattacatcttctttgggaaaggccctcagaaaaagggagct agcaaacaagaccagagtgccaatgagaagaataaactggagatgaataaagtccaggtaagata ttaaatattcctaacaatattcttgttaaatttatcagcatcATGATGCCTCGGGCTCTC	385
GABRB1d6	GABRB1	G	A	L	L	cds	GE1144	TGAAAACAGGC AAAGGTCC	TGGGGACCTGT AAGGTTAAAAA	TGAAAACAGGCAAAGGTCCtgcaacttgtgtccgagcctgttctttttgccatcaggtcgacgcc *cacggtaacattctcctcagcaccctggaaatccggaatgagacgagtggctcggaagtgctcac* gagcgtgagcgaccccaaggccaccatgtactcctatgacagcgccagcatccagtaccgcaagc ccctgagcagccgcgaggcctacgggcgcgccctggaccggcacggggtacccagcaaggggcgc atccgcaggcgtgcctcccagctcaaagtcaagatccccgactt[g/a]actgatgtgaattcca tagacaagtggtcccgaatgtttttccccatcacctttctctttttaatgtcgtctattggctt tactatgtacactgaggtctgttctaatggttccatttagactactttcctcttctattgtTTTT TAACCTTACAGGTCCCCA	473
GABRB1u1	GABRB1	G	A	T	T	cds	GE1134	CCTCTCAATCT TGAAAAAGGA	GAGAGCCCGAG GCATCAT	CCTCTCAATCTTGAAAAAGGAacttaatagtggcaccttcagctaagtgttgtctttctctttca caggaatcacgac[g/a]gtgcttacaatgacaaccatcagcacccacctcagggagaccctgcc aaagatcccttatgtcaaagcgattgatatttatctgatgggttgctttgtgtttgtgttcctgg ctctgctggagtatgcctttgtaaattacatcttctttgggaaaggccctcagaaaaagggagct agcaaacaagaccagagtgccaatgagaagaataaactggagatgaataaagtccaggtaagata ttaaatattcctaacaatattcttgttaaatttatcagcatcATGATGCCTCGGGCTCTC	385

FIG. 5TTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GABRB1u2	GABRB1	C	T	A	A	cds	GE1134	CCTCTCAATCTTGAAAAAGGA	GAGAGCCCGAGGCATCAT	CCTCTCAATCTTGAAAAAGGAacttaatagtggcaccttcagctaagtgttgtctttctctttcacaggaatcacgacggtgcttacaatgacaaccatcagcacccacctcagggagaccctgccaaagatcccttatgtcaaagcgattgatatttatctgatgggttgctttgtgtttgtgttcctggctctgctggagtatgc[c/t]tttgtaaattacatcttctttgggaaaggccctcagaaaaagggagctagcaaacaagaccagagtgccaatgagaagaataaactggagatgaataaagtccaggtaagatattaaatattcctaacaatattcttgttaaatttatcagcatcATGATGCCTCGGGCTCTC	385
GAP43d3	GAP43	G	A	V	I	cds	GE1166	TCATTGAAGCCCTCTCTTT	TTCCCCATCCACCCATT	TCATTGAAGCCCTCTCTTTttttctcgacaaaggttgaaaaaaatgatgacgaccaaaagattgaacaagatggtatcaaaccagaagataaagctcataaggccgcaaccaaaattcaggctagcttccgtggacacataacaaggaaaaagctcaaaggagagaagaaggatgat[g/a]tccaagctgctgaggctgaagctaataagaaggatgaagcccctgttgccgatggggtggagaagaagggagaaggcaccactactgccgaagcagccccagccactggctccaagcctgatgagcccggcaaagcaggagaaactccttccgaggagaagaaggggagggtgatgctgccacagagcaggcagccccccaggctcctgcatcctcagaggagaaggccggctcagctgagacagaaagtgccactaaagcttccactgataactcgccgtcctccaaggctgaagatgccccagccaaggaggagcctaaacaagccgatgtgcctgctgctgtcactgctgctgctgccaccacccctgccgcagaggatgctgctgccaaggcaacagcccagcctccaacggagactggggagagcagccaagctgaagagaacataggtgagcaaccgcgagggtcagatgcAATGGGTGGATGGGGAA	678
GAP43u1	GAP43	T	A	R	R	cds	GE1166	TCATTGAAGCCCTCTCTTT	TTCCCCATCCACCCATT	TCATTGAAGCCCTCTCTTTttttctcgacaaaggttgaaaaaaatgatgacgaccaaaagattgaacaagatggtatcaaaccagaagataaagctcataaggccgcaaccaaaattcaggctagcttccg[t/a]ggacacataacaaggaaaaagctcaaaggagagaagaaggatgatgtccaagctgctgaggctgaagctaataagaaggatgaagcccctgttgccgatggggtggagaagaagggagaaggcaccactactgccgaagcagccccagccactggctccaagcctgatgagcccggcaaagcaggagaaactccttccgaggagaagaaggggagggtgatgctgccacagagcaggcagccccccaggctcctgcatcctcagaggagaaggccggctcagctgagacagaaagtgccactaaagcttccactgataactcgccgtcctccaaggctgaagatgccccagccaaggaggagcctaaacaagccgatgtgcctgctgctgtcactgctgctgctgccaccacccctgccgcagaggatgctgctgccaaggcaacagcccagcctccaacggagactggggagagcagccaagctgaagagaacataggtgagcaaccgcgagggtcagatgcAATGGGTGGATGGGGAA	678
GAP43u2	GAP43	G	A	E	E	cds	GE1166	TCATTGAAGCCCTCTCTTT	TTCCCCATCCACCCATT	TCATTGAAGCCCTCTCTTTttttctcgacaaaggttgaaaaaaatgatgacgaccaaaagattgaacaagatggtatcaaaccagaagataaagctcataaggccgcaaccaaaattcaggctagcttccgtggacacataacaaggaaaaagctcaaaggagagaagaaggatgatgtccaagctgctgaggctgaagctaataagaaggatgaagcccctgttgccgatggggtggagaagaaggggagaaggcaccactactgccgaagcagccccagccactggctccaagcctgatgagcccggcaaagcaggagaaactccttccgaggagaagaaggggagggtgatgctgccacagagcaggcagccccccaggctcctgcatcctcagaggagaaggccggctcagctgagacagaaagtgccactaaagcttccactgataactcgccgtcctccaaggctgaagatgccccagccaaggagga[g/a]cctaaacaagccgatgtgcctgctgctgtcactgctgctgctgccaccacccctgccgcagaggatgctgctgccaaggcaacagcccagcctccaacggagactggggagagcagccaagctgaagagaacataggtgagcaaccgcgagggtcagatgcAATGGGTGGATGGGGAA	678
GH1d7	GH1	G	T	-	-	noncoding	GE609	GGGGGAGACCTGTAGTCAG	GTCAGTGGGGCTCCAAGATT	GGGGGAGACCTGTAGTCAGagccccccgggcagcacaggccaatgcccgtccttcccctgcagaacctagagctgctccgcatctccctgctgctcatccagtcgtggctggagcccgtgcagttcctcaggagtgtcttcgccaacagcctggtgtacggcgcctctgacagcaacgtctatgacctcctaaaggacctagaggaaggcatccaaacgctgatgggggtgggggtggcgctaggg[g/t]tccccAATCTTGGAGCCCCACTGAC	275

FIG. 5UUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GH1u1	GH1	G	A	-	-	noncoding	GE527	AAGGGGCCAGG GTATAAAAA	TCTCCCCTCAG GACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagacc[g/a]gctcaaggatcccaaggcccaact ccccgaaccactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgccccct aaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u2	GH1	A	C	-	-	noncoding	GE527	AAGGGGCCAGG GTATAAAAA	TCTCCCCTCAG GACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctcaaggatcccaaggcccaactcccc g[a/c]accactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgccccct aaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u3	GH1	T	G	-	-	noncoding	GE527	AAGGGGCCAGG GTATAAAAA	TCTCCCCTCAG GACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctcaaggatcccaaggcccaactcccc gaaccactcagggtcctgtggacagctcacctagc[t/g]gcaatggctacaggtaagcgccccct aaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u4	GH1	C	G	S	C	cds	GE609	GGGGGAGACCT GTAGTCAG	GTCAGTGGGGC TCCAAGATT	GGGGGAGACCTGTAGTCAGagcccccgggcagcacaggccaatgcccgtccttcccctgcagaac ctagagctgctccgcatct[c/g]cctgctgctcatccagtcgtggctggagcccgtgcagttcc tcaggagtgtcttcgccaacagcctggtgtacggcgcctctgacagcaacgtctatgacctcta aaggacctagaggaaggcatccaaacgctgatgggggtgggggtggcgctaggggtccccAATCT TGGAGCCCCACTGAC	275
GH1u5	GH1	A	T	-	-	noncoding	GE527	AAGGGGCCAGG GTATAAAAA	TCTCCCCTCAG GACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctc[a/t]aggatcccaaggcccaact ccccgaaccactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgccccct aaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u6	GH1	G	C	-	-	noncoding	GE527	AAGGGGCCAGG GTATAAAAA	TCTCCCCTCAG GACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctcaag[g/c]atcccaaggcccaact ccccgaaccactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgccccct aaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GHRa9	GHR	C	G	-	-	noncoding	GE602	GCTACAACATG ATTTTTGGAAC A	GCTTCCCCATT TATTTAGTCT	GCTACAACATGATTTTTGGAACAattaatctttttttaacccttcattttaggaacactcaagaa tggactcaagaatggaaagaatgccctgattatgtttctgctggggaaaacagctgttacttttaa ttcatcgtttacctccatctggataccttattgtatcaagctaactagcaatggtggtacagtgg atgaaaagtgtttctctgttgatgaaataggLaaatcacaggtttttgtttcatttgacatagtt t[c/g]AGACTAAATAAATGGGGAAGC	287
GHRd7	GHR	G	A	R	H	cds	GE597	TTGAGTTGTTG ACTCTTTGGC	TGACAAAAGCC AGGTTAGC	TTGAGTTGTTGACTCTTTGGCcaatatggcgtttatatttttgtcttgaaagatggaccctatat tgacaacatcagttccagtgtactcattgaaagtggataaggaatatgaagtgc[g/a]tgtgag atccaaacaacgaaactctggaaattatggcgagttcagtgaggtgctctatgtaacacttcctc agatgagccaatttacatgtgaagaaggtaaaagaaataaaagattaaaatagtaGCTAACCTGG CTTTTGTCA	269
GHRd8	GHR	C	T	-	-	noncoding	GE597	TTGAGTTGTTG ACTCTTTGGC	TGACAAAAGCC AGGTTAGC	TTGAGTTGTTGACTCTTTGGC[c/t]aatatggcgtttatattttgtcttgaaagatggaccct atattgacaacatcagttccagtgtactcattgaaagtggataaggaatatgaagtgcgtgtgag atccaaacaacgaaactctggaaattatggcgagttcagtgaggtgctctatgtaacacttcctc agatgagccaatttacatgtgaagaaggtaaaagaaataaaagattaaaatagtaGCTAACCTGG CTTTTGTCA	269
GHRu1	GHR	A	G	G	G	cds	GE596	TTAAATTGTGT CTGTCTGTGTA CT	GAAAGAAAAGT CAAAGTGTAAG G	TTAAATTGTGTCTGTCTGTGTACTaatgctctgttgaattgcacagtgcaaccagatccacccat tgccctcaactggactttactgaacgtcagtttaactgggattcatgcagatatccaagtgagat gggaagcaccacgcaatgcagatattcagaaagg[a/g]tggatggttctggagtatgaacttca atacaaagaagtaaatgaaactaaatggaaaatggtaagatgttgctacaCCTTACACTTTGACT TTTCTTTC	268

FIG. 5VVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GHRu2	GHR	A	C	I	L	cds	GE649	GCCCATATTCA GCTAAGCAAT	ATTGCCCCAGT CAATTCTTT	GCCCATATTCAGCTAAGCAATccaagttcactgtcaaacatcgacttttatgcccaggtgagcga cattacaccagcaggtagtgtggtcctttccccgggccaaaagaataaggcagggatgtcccaat gtgacatgcacccggaaatggtctcactctgccaagaaaacttccttatggacaatgcctacttc tgtgaggcagatgccaaaaagtgc[a/c]tccctgtggctcctcacatcaaggttgaatcacaca tacagccaagcttaaaccaagaggacatttacatcaccacagaaagccttaccactgctgctggg aggcctgggacaggagaacatgttccaggttctgagatgcctgtcccagactatacctccattca tatagtacagtccccacagggcctcatactcaatgcgactgccttgcccttgcctgacaaagagt ttctctcatcatgtggctatgtgagcacagaccaactgaacaaaatcatgccttagcctttcttt ggtttcccaagagctacgtatttaatagcAAAGAATTGACTGGGGCAAT	569
GHRu3	GHR	G	A	R	H	cds	GE596	TTAAATTGTGT CTGTCTGTGTA CT	GAAAGAAAAGT CAAAGTGTAAG G	TTAAATTGTGTCTGTCTGTGTACTaatgctctgttgaattgcacagtgcaaccagatccacccat tgccctcaactggactttactgaacgtcagtttaactgggattcatgcagatatccaagtgagat gggaagcaccac[g/a]caatgcagatattcagaaaggatggatggttctggagtatgaacttca atacaaagaagtaaatgaaactaaatggaaaatggtaagatgttgctacaCCTTACACTTTGACT TTTCTTTC	268
GHRu4	GHR	G	T	C	F	cds	GE1207	GCCATTCATGA TAGCTATAAAC C	CTCACCTGGGC ATAAAAGT	GCCATTCATGATAGCTATAAACCcgaattccacagtgatgactcttgggttgaatttattgagct agatattgatgagccagatgaaaagactgaggaatcagacacagacagacttctaagcagtgacc atgagaaatcacatagtaacctaggggtgaaggatggcgactctggacgtaccagctgttgtgaa cctgacattctggagactgatttcaatgccaatgacatacatgagggtacctcagaggttgctca gccacagaggttaaaaggggaagcagatctcttatgccttgaccagaagaatcaaaataactcac cttatcatgatgctt[g/t]ccctgctactcagcagcccagtgttatccaagcagagaaaaacaa accacaaccacttcctactgaaggagctgagtcaactcaccaagctgcccatattcagctaagca atccaagttcactgtcaaacatcgACTTTTATGCCCAGGTGAG	498
GHRu5	GHR	C	A	P	T	cds	GE649	GCCCATATTCA GCTAAGCAAT	ATTGCCCCAGT CAATTCTTT	GCCCATATTCAGCTAAGCAATccaagttcactgtcaaacatcgacttttatgcccaggtgagcga cattaca[c/a]cagcaggtagtgtggtcctttccccgggccaaaagaataaggcagggatgtcc caatgtgacatgcacccggaaatggtctcactctgccaagaaaacttccttatggacaatgccta cttctgtgaggcagatgccaaaaagtgcatccctgtggctcctcacatcaaggttgaatcacaca tacagccaagcttaaaccaagaggacatttacatcaccacagaaagccttaccactgctgctggg aggcctgggacaggagaacatgttccaggttctgagatgcctgtcccagactatacctccattca tatagtacagtccccacagggcctcatactcaatgcgactgccttgcccttgcctgacaaagagt ttctctcatcatgtggctatgtgagcacagaccaactgaacaaaatcatgccttagcctttcttt ggtttcccaagagctacgtatttaatagcAAAGAATTGACTGGGGCAAT	569
GHRu6	GHR	C	A	P	T	cds	GE649	GCCCATATTCA GCTAAGCAAT	ATTGCCCCAGT CAATTCTTT	GCCCATATTCAGCTAAGCAATccaagttcactgtcaaacatcgacttttatgcccaggtgagcga cattacaccagcaggtagtgtggtcctttccccgggccaaaagaataaggcagggatgtcccaat gtgacatgcacccggaaatggtctcactctgccaagaaaacttccttatggacaatgcctacttc tgtgaggcagatgccaaaaagtgcatccctgtggctcctcacatcaaggttgaatcacacataca gccaagcttaaaccaagaggacatttacatcaccacagaaagccttaccactgctgctgggagg[c/a]ctgggacaggagaacatgttccaggttctgagatgcctgtcccagactatacctccattca tatagtacagtccccacagggcctcatactcaatgcgactgccttgcccttgcctgacaaagagt ttctctcatcatgtggctatgtgagcacagaccaactgaacaaaatcatgccttagcctttcttt ggtttcccaagagctacgtatttaatagcAAAGAATTGACTGGGGCAAT	569
GNRHRu 1	GNRHR	G	C	W	S	cds	GE599	TCAACCTTGTC TGGATCTAATT T	GGGGCTATCCT GAATGTTTAAT A	TCAACCTTGTCTGGATCTAATTTgattgtgcattcatgtgccttagaatgaagccaattcaaaaa ctcctagctggccttattctactgactt[g/c]gtgcgtggaaggctgctccagccagcactggt cctatggactgcgccctggaggaaagagagatgccgaaaatttgattgattctttccaagaggta agtttctctcagcttcaaaataagacatagtgatttgattcaatttaactaTATTAAACATTCAG GATAGCCCC	269

FIG. 5WWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GNRHRu 2	GNRHR	C	T	F	F	cds	GE569	GGAAAACACCA TTTCATTTCT	CAAAGGCTTAT CCACCTCTA	GGAAAACACCATTTCATTTCTttatctccatctcaaagcatcacattctctttcttcagatagtc aaagaggttggtcaactggcagaaacccaacgctt[c/t]gaatgcaccacgcaccagccacgtt ctcccctccgagacctgaaaggagctctggtaagttaaagtgatcataacatgatcacagcatag agctcTAGAGGTGGATAAGCCTTTG	220
GNRHRu 3	GNRHR	A	C	-	-	noncoding	GE578	CATTAAAGGGC TTTATGTGAGG AT	TCTAAAGAAGA AAAACTCGTGC TA	CATTAAAGGGCTTTATGTGAGGATtttaaaaattaccattaaaaaaaaaaaagcatagtccatt tgcagtataatttaccagcaggaaagatttcaatgtcctggaaaaattccctataaaaaggaaga taggaaaacagaaaagtcacagtactcaacctacttcaagggaagattgggatcttttggctct ctgcctctaaacaggtaa[a/c]aggctttgtattatttcTAGCACGAGTTTTTCTTCTTTAGA	259
GNRHRu 4	GNRHR	C	A	S	Y	cds	GE599	TCAACCTTGTC TGGATCTAATT T	GGGGCTATCCT GAATGTTTAAT A	TCAACCTTGTCTGGATCTAATTTgattgtgcattcatgtgccttagaatgaagccaattcaaaaa ctcctagctggccttattctactgacttggtgcgtggaaggctgct[c/a]cagccagcactggt cctatggactgcgccctggaggaaagagagatgccgaaaatttgattgattctttccaagaggta agtttctctcagcttcaaaataagacatagtgatttgattcaatttaactaTATTAAACATTCAG GATAGCCCC	269
GNRHRu 5	GNRHR	G	T	-	-	noncoding	GE599	TCAACCTTGTC TGGATCTAATT T	GGGGCTATCCT GAATGTTTAAT A	TCAACCTTGTCTGGATCTAATTTgattgtgcattcatgtgccttagaatgaagccaattcaaaaa ctcctagctggccttattctactgacttggtgcgtggaaggctgctccagccagcactggtccta tggactgcgccctggaggaaagagagatgccgaaaatttgattgattctttccaagag[g/t]ta agtttctctcagcttcaaaataagacatagtgatttgattcaatttaactaTATTAAACATTCAG GATAGCCCC	269
GP1BAd 2	GP1BA	C	T	T	M	cds	GE493	CTTCCAGGGGA TGCAGG	AAAAGCAAAAG GCAGGAGGT	CTTCCAGGGGATGCAGGggatccactcaaggctcccttgcccacaggtcctcatgcctctcctc ctcttgctgctcctgctgccaagccccttacacccccaccccatctgtgaggtctccaaagtggc cagccacctagaagtgaactgtgacaagaggaatctgacagcgctgcctccagacctgccgaaag acacaaccatcctccacctgagtgagaacctcctgtacaccttctccctggcaaccctgatgcct tacactcgcctcactcagctgaacctagataggtgcgagctcaccaagctccaggtcgatgggac gctgccagtgctggggaccctggatctatcccacaatcagctgcaaagcctgcccttgctagggc agacactgcctgctctcaccgtcctggacgtctccttcaaccggctgacctcgctgcctcttggt gccctgcgtggtcttggcgaactccaagagctctacctgaaaggcaatgagctgaagaccctgcc cccagggctcctga[c/t]gcccacacccaagctggagaagctcagtctggctaacaacaacttg actgagctccccgctgggctcctgaatgggctggagaatctcgacacccttctcctccaagagaa ctcgctgtatacaataccaaagggctttttgggtcccACCTCCTGCCTTTTGCTTTT	708
GP1BAd 3	GP1BA	C	T	N	N	cds	GE495	GACACCCTTCT CCTCCAAGA	GATTGGGGTGG GCTCCG	GACACCCTTCTCCTCCAAGAgaactcgctgtatacaataccaaagggctttttgggtcccacct cctgcctttttgcttttctccacgggaacccctggttatgcaactgtgagatcctctattttcgtc gctggctgcaggacaatgctgaaaatgtctacgtatggaagcaaggtgtggacgtcaaggccatg acctctaa[c/t]gtggccagtgtgcagtgtgacaattcagacaagtttcccgtctacaaatacc caggaaaggggtgccccaccttggtgatgaaggtgacacagacctatatgattactacccagaa gaggacactgagggcgataaggtgcgtgccacaaggactgtggtcaagttccccaccaaagccca tacaaccccctggggtctattctactcatggtccactgcttctctagacagccaaatgccctcct ccttgcatccaacacaagaatccactaaggagcagaccacattcccacctagatggaccccaaat ttcacacttcacatggaatccatcacattctccaaaactccaaaatccactactgaaccaacccc aagcccgaccacctcagagcccgtcccggagcccgccccaaacatgaccaccctggagcccactc caagcccgaccaccccagagcccacctcagagcccgccccagcccgaccacccCGGAGCCCACC CCAATC	721

FIG. 5XXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GP1BAd4	GP1BA	A	G	R	R	cds	GE495	GACACCCTTCT CCTCCAAGA	GATTGGGGTGG GCTCCG	GACACCCTTCTCCTCCAAGAgaactcgctgtatacaataccaaagggctttttgggtcccacct cctgccttttgcttttctccacgggaacccctggttatgcaactgtgagatcctctattttcgtc gctggctgcaggacaatgctgaaaatgtctacgtatggaagcaaggtgtggacgtcaaggccatg acctctaacgtggccagtgtgcagtgtgacaattcagacaagtttcccgtctacaaatacccagg aaaggggtgccccacccttggtgatgaaggtgacacagacctatatgattactacccagaagagg acactgagggcgataaggtgcgtgccacaaggactgtggtcaagttccccaccaaagcccataca acccccctggggtctattctactcatggtccactgcttctctagacagccaaatgcccctcctctt gcatccaacacaagaatccactaaggagcagaccacattcccacctag[a/g]tggaccccaaat ttcacacttcacatggaatccatcacattctccaaaactccaaaatccactactgaaccaacccc aagcccgaccacctcagagcccgtcccggagcccgccccaaacatgaccaccctggagcccactc caagcccgaccaccccagagcccacctcagagcccgcccccagcccgaccacccCGGAGCCCACC CCAATC	721
GP1BAu1	GP1BA	G	A	R	H	cds	GE493	CTTCCAGGGGA TGCAGG	AAAAGCAAAAG GCAGGAGGT	CTTCCAGGGGATGCAGGgggatccactcaaggctcccttgcccacaggtcctcatgcctctcctc ctcttgctgctcctgctgccaagccccttacaccccacccccatctgtgaggtctccaaagtggc cagccacctagaagtgaactgtgacaagaggaatctgacagcgctgcctccagacctgccgaaag acacaaccatcctcacctgagtgagaacctcctgtacaccttctccctggcaaccctgatgcct tacactc[g/a]cctcactcagctgaacctagataggtgcgagctcaccaagctccaggtcgatg ggacgctgccagtgctggggaccctggatctatcccacaatcagctgcaaagcctgcccttgcta gggcagacactgcctgctctcaccgtcctggacgtctccttcaaccggctgacctcgctgcctct tggtgccctgcgtggtcttggcgaactccaagagctctacctgaaaggcaatgagctgaagaccc tgcccccagggctcctgacgcccacacccaagctggagaagctcagtctggctaacaacaacttg actgagctccccgctgggctcctgaatgggctggagaatctcgacacccttctcctccaagagaa ctcgctgtatacaataccaaagggctttttgggtcccACCTCCTGCCTTTTGCTTTT	708
GP5d1	GP5	C	T	P	P	cds	GE908	AGTACAGGCGC GAACGCT	AACCCCTTGGG CAGGTG	AGTACAGGCGCGAACGCTcctgtgtgttgaccacactcccacggttgctttttcagacatgctga gggggactctactgtgcgcggtgctcgggcttctgcgcgcccagcccttcccctgtccgccagct tgcaagtgtgtcttccgggacgccgcgcagtgctcgggggcgacgtggcgcgcatctccgcgct gggcctgcccaccaacctcacgcacatcctgctcttcggaatgggccgcggcgtcctgcagagcc agagcttcagcggcatgaccgtcctgcagcgcctcatgatctccgacagccacatttccgccgtt gcccc[c/t]ggcaccttcagtgacctgataaaactgaaaaccctgaggctgtcgcgcaacaaaa tcacgcatcttccaggtgcgctgctggataagatggtgctcctggagcagttgtttttggaccac aatgcgctaaggggcattgaccaaaacatgtttcagaaactggttaacctgcaggagctcgctct gaaccagaatcagctcgatttccttcctgccagtctcttcacgaatctggagaacctgaagttgt tggatttatcgggaaacaacctgacccCACCTGCCCAAGGGGTT	628
GP5d2	GP5	G	A	Q	Q	cds	GE908	AGTACAGGCGC GAACGCT	AACCCCTTGGG CAGGTG	AGTACAGGCGCGAACGCTcctgtgtgttgaccacactcccacggttgctttttcagacatgctga gggggactctactgtgcgcggtgctcgggcttctgcgcgcccagcccttcccctgtccgccagct tgcaagtgtgtcttccgggacgccgcgcagtgctcgggggcgacgtggcgcgcatctccgcgct gggcctgcccaccaacctcacgcacatcctgctcttcggaatgggccgcggcgtcctgcagagcc agagcttcagcggcatgaccgtcctgcagcgcctcatgatctccgacagccacatttccgccgtt gcccccggcaccttcagtgacctgataaaactgaaaaccctgaggctgtcgcgcaacaaaatcac gcatcttccaggtgcgctgctggataagatggtgctcctggagcagttgtttttggaccacaatg cgctaaggggcattgaccaaaacatgtttcagaaactggttaacctgca[g/a]gagctcgctct gaaccagaatcagctcgatttccttcctgccagtctcttcacgaatctggagaacctgaagttgt tggatttatcgggaaacaacctgacccCACCTGCCCAAGGGGTT	628

FIG. 5YYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GP5d3	GP5	G	A	L	L	cds	GE908	AGTACAGGCGC GAACGCT	AACCCCTTGGG CAGGTG	AGTACAGGCGCGAACGCTcctgtgtgttgaccacactcccacggttgctttttcagacatgctga ggggggactctactgtgcgcggtgctcgggcttctgcgcgcccagcccttcccctgtccgccagct tgcaagtgtgtcttccgggacgccgcgcagtgctcgggggcgacgtggcgcgcatctccgcgct [g/a]ggcctgcccaccaacctcacgcacatcctgctcttcggaatgggccgcggcgtcctgcag agccagagcttcagcggcatgaccgtcctgcagcgcctcatgatctccgacagccacatttccgc cgttgcccccggcaccttcagtgacctgataaaactgaaaaccctgaggctgtcgcgcaacaaaa tcacgcatcttccaggtgcgctgctggataagatggtgctcctggagcagttgtttttggaccac aatgcgctaaggggcattgaccaaaacatgtttcagaaactggttaacctgcaggagctcgctct gaaccagaatcagctcgatttccttcctgccagtctcttcacgaatctggagaacctgaagttgt tggatttatcgggaaacaacctgaccCACCTGCCCAAGGGTT	628
GP9u1	GP9	G	A	T	T	cds	GE401	CTACATCCCCA GTGCTTGC	TCTGGTGGTTT GGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccc ctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagc agaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtggg tggactgcaggggccacggactcac[g/a]gccctgcctgccctgccggcccgcacccgccacct tctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgc agaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcctctgg ctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgccca tggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcaggcgtcct gggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctctt ctggctggcctgctgtgtgccaccacagaggccctggattgagccaggccccagaacctggctc cagccaggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCAC CAGA	719
GP9u2	GP9	C	G	L	L	cds	GE401	CTACATCCCCA GTGCTTGC	TCTGGTGGTTT GGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccc ctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagc agaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtggg tggactgcaggggccacggactcacggccctgcctgccctgccggcccgcacccgccacctctg ctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgcagac cctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcct[c/g]tgg ctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgccca tggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcct gggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctctt ctggctggcctgctgtgtgccaccacagaggccctggattgagccaggccccagaacctggctc cagccaggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCAC CAGA	719
GP9u3	GP9	T	A	W	R	cds	GE401	CTACATCCCCA GTGCTTGC	TCTGGTGGTTT GGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccc ctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctc[t/a]gggcca cagcagaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctg tgggtggactgcaggggccacggactcacggccctgcctgccctgccggcccgcacccgccacct tctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgc agaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcctctgg ctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgccca tggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcct gggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctctt ctggctggcctgctgtgtgccaccacagaggccctggattgagccaggccccagaacctggctc cagccaggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCAC CAGA	719

FIG. 5ZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GP9u4	GP9	G	A	A	T	cds	GE401	CTACATCCCCA GTGCTTGC	TCTGGTGGTTT GGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccc ctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagc agaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtggg tggactgcaggggccacggactcacg[g/a]ccctgcctgccctgccggcccgcacccgccacct tctgctggccaacaacagccttcagtccgtgccccgggagcctttgaccacctgccccagctgc agaccctcgatgtgacgcagaaccccctggcactgtgactgcagcctcacctatctgcgcctctgg ctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgccca tggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcct gggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctctt ctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctc cagccaggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCAC CAGA	719
GP9u5	GP9	G	A	A	T	cds	GE401	CTACATCCCCA GTGCTTGC	TCTGGTGGTTT GGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccc ctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagc agaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtggg tggactgcaggggccacggactcacggccctgcctgccctgccggcccgcacccgccacctttctg ctggccaacaacagccttcagtccgtgccccgggagcctttgaccacctgccccagctgcagac cctcgatgtgacgcagaaccccctggcactgtgactgcagcctcacctatctgcgcctctggctgg aggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgcccatggc ccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcctgggt gcgcccgggggtcttgtgggacgtggcgctggtc[g/a]ccgtggccgcgctgggcctggctctt ctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctc cagccaggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCAC CAGA	719
GRFu1	GRF	C	T	L	F	cds	GE510	AACCACACAGA GAGAGCAAC	ACACCCATACC TGTGCTT	AACCACACAGAGAGAGCAACcaagagcgaggagcaagggcacgg[c/t]ttggtcgtcaggtaga cagcatgtgggcagaacaaaagcaaatggaattggagagcatcctggtggccctgctgcagAAGC ACAGGTATGGGTGT	144
GRIN1u 1	GRIN1	T	A	I	N	cds	GE1121	AGTGCTGGGCC TTGGCG	GAGTGACCCCG CCCACC	AGTGCTGGGCCTTGGCGgggtccccgaacggggaggaccccacgggctctgagtcgcatgctcgc ctaggca[t/a]cctcgggctgcagctcatcaacggcaagaacgagtcggcccacatcagcgacg ccgtgggcgtggtggcccaggccgtgcacgagctcctcgagaaggagaacatcaccgacccgccg cggggctgcgtgggcaacaccaacatctggaagaccgggccgctcttcaagaggtgggcggggcc tccccggagctgggcggggctgctcttggggaGGTGGGCGGGGTCACTC	309
GRIN1u 2	GRIN1	G	C	D	H	cds	GE1293	CCCCCGCAGAC AGACAG	CCTTCCCGAGC AGCAGG	CCCCCGCAGACAGACAGacagacggatgggacagcggcccggcccacgcagagccccggagcacc acggggtcgggggaggagcacccccagcctcccccaggctgcgcctgcccgcccgccggttggcc ggctggccggtccaccccgtcccggccccgcgcgtgcccccagcgtggggctaacgggcgccttg tctgtgtatttctattttgcagcagtaccatcccactgatatcacgggcccgctcaacctctca[g/c]atccctcggtcagcaccgtggtgtgaggccccggaggcgcccacctgcccagttagcccg gccaaggacactgatgggtCCTGCTGCTCGGGAAGG	361
GRIN1u 3	GRIN1	A	G	P	P	cds	GE1085	GAGGACCTGGG CCTGCG	AGCCCGTGGGG TCCTCC	GAGGACCTGGGCCTGCGgagcgccgcggtgggagtgctggagtcctggcccgtcatccccgtctg ccccacagcgaggacgatgctgccactgtataccgcgcagccgcgatgctgaacatgacgggctc cgggtacgtgtggctggtcggcgagcgcgagatctcggggaacgccctgcgctacgcccc[a/g] gacggtgagtgctgggccttggcggggtccccgaacggGGAGGACCCCACGGGCT	250

FIG. 5AAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRIN1u 4	GRIN1	G	C	E	Q	cds	GE1287	GAGCTGAGAAG AGACTGCCG	GTAGGTGCGGG CGGTAACT	GAGCTGAGAAGAGACTGCCGccctgggcagccttaggtcggtggtccaggctgggtctcccccttc cccccagattgtgacgatccaccag[g/c]agcccttcgtgtacgtcaagcccacgctgagtga tgggacatgcaaggaggagttcacagtcaacggcgacccagtcaagaaggtgatctgcaccgggc ccaacgacacgtcgccgggcagccgtgagtgcgcggggcagggcgcggggcgcggggcagggcgc ggggcgtggggcggtctggagcccagcAGTTACCGCCCGCACCTAC	306
GRIN1u 5	GRIN1	T	G	C	G	cds	GE1287	GAGCTGAGAAG AGACTGCCG	GTAGGTGCGGG CGGTAACT	GAGCTGAGAAGAGACTGCCGccctgggcagccttaggtcggtggtccaggctgggtctcccccttc cccccagattgtgacgatccaccaggagcccttcgtgtacgtcaagcccacgctgagtgatggg aca[t/g]gcaaggaggagttcacagtcaacggcgacccagtcaagaaggtgatctgcaccgggc ccaacgacacgtcgccgggcagccgtgagtgcgcggggcagggcgcggggcgcggggcagggcgc ggggcgtggggcggtctggagcccagcAGTTACCGCCCGCACCTAC	306
GRIN1u 6	GRIN1	G	C	D	H	cds	GE1287	GAGCTGAGAAG AGACTGCCG	GTAGGTGCGGG CGGTAACT	GAGCTGAGAAGAGACTGCCGccctgggcagccttaggtcggtggtccaggctgggtctcccccttc cccccagattgtgacgatccaccaggagcccttcgtgtacgtcaagcccacgctgagtgatggg acatgcaaggaggagttcacagtcaacggcgacccagtcaagaaggtgatctgcaccgggcccaa c[g/c]acacgtcgccgggcagccgtgagtgcgcggggcagggcgcggggcgcggggcagggcgc ggggcgtggggcggtctggagcccagcAGTTACCGCCCGCACCTAC	306
GRIN1u 7	GRIN1	G	A	K	K	cds	GE1115	GCGGGAGCTGG GAGGAC	AGGGACGCGAG GTCAGC	GCGGGAGCTGGGAGGACgctgcctgcatgcccgccggctctgtcgcctcgcaggtgaacaacagc aacaagaaggagtggaatgggatgatgggcgagctgctcagcgggcaggcagacatgatcgtggc gccgctaaccataaacaacgagcgcgcgcagtacatcgagttttccaagcccttcaagtaccagg gcctgactattctggtcaa[g/a]aaggtgggcaggggccgggtggcggggtggcggcgggggga gtccctggagggcccgggccgcGCTGACCTCGCGTCCCT	299
GRIN1u 8	GRIN1	G	A	E	E	cds	GE1120	TTCCGGCAGTG GGAGGC	CGTCCTGCACC TCGGCT	TTCCGGCAGTGGGAGGCgggtgggagggcgggtccccgcgggtccacctcagcccaccgtgcccc cgcctcccgcagagcatccacctgagcttcctgcgcaccgtgccgccctactcccaccagtccag cgtgtggtttgagatgatgcgtgtctacagctggaaccacatcatcctgctggtcagcgacgacc acga[g/a]ggccgggcggctcagaaacgcctggagacgctgctggaggagcgtgagtccaaggt gagggtcggcgccgcgggtgggcgcctggcggAGCCGAGGTGCAGGACG	309
GRLd17	GRL	G	T	-	-	noncoding	GE1196	ATTCAAGGTGG CCAAATTAT	AAAGAAAACAA AAACATGTCC	ATTCAAGGTGGCCAAATTATttgtgtaatagaaaactgaaaatctaatattaaaaatatggaact tctaatatatttttatatttagttatagtttcagatatatatcatattggtattcactaatctgg gaagggaagggctactgcagctttacatgcaatttattaaaatgattgtaaaatagcttgtatag tgtaaaataagaatgatttttagatgagattgttttatcatgacatgttatatatttttttgtagg [g/t]gtcaaagaaatgctgatggataacctatatgatttatagtttgtacatgcattcatacag gcagcgatggtctcagaaaccaaacagtttgctctaggggaagagggagatggagactggtcctg tgtgcagtgaaggttgctgaggctctgacccagtgagattacagaggaagttatcctctgcctcc catttctgaccacccttctcattccaacagtgagtctgtcagcgcaggtttagtttactcaatctc cccttgcactaaagtatgtaaagtatgtaaacaggagacaggaaggtggtgcttacatccttaaa ggcaccatctaatagcgggttactttcacatacagccctcccccagcagttgaatgacaacagaa gcttcagaagtttggcaatagtttgcatagaggtaccagcaatatgtaaatagtgcagaatctca taggttgccaataatacactaattccttttctatcctacaacaagagtttatttccaaataaaatg aGGACATGTTTTTGTTTTCTTT	802
GRLd18	GRL	G	T	-	-	noncoding	GE628	GACCTTCCCAT TACAGTTCATT TC	GAAGAAAACAC AAAGGTTTATA TAGTTGC	GACCTTCCCATTACAGTTCATTTCtatgtattt[g/t]tttaaatacccacagctcgaaaaacaa agaaaaaaatataaaggaattcagcaggccactacaggagtctcacaagaaacctctgaaaatcct ggtaacaaaacaatagttcctgcaacgttaccacaactcacccctaccctggtgtcactgttgga ggttattgaacctgaagtgttatatgcaggatatgatagctctgttccagactcaacttggagga tcatgactacgctcaacatgttaggagggcggcaagtgattgcagcagtgaaatgggcaaaggca ataccaggtaagatgcaaaacataaaagaGCAACTATATAAACCTTTGTGTTTTCTTC	383

FIG. 5BBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLd19	GRL	G	A	E	E	cds	GE666	TGTGACTTTAG AGCTTATGATG TT	GACCCAGAAGA AAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTTtccccccggtttttgtttttttgttttgtagttgatattcac tgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcag ga[g/a]aggggagatgtgatggacttctataaaaccctaagaggaggagctactgtgaaggttt ctgcgtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggtt gattttccaaaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctc aatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagc agggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaac ctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgc ccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagg gccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacatt ttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLd20	GRL	G	A	R	K	cds	GE666	TGTGACTTTAG AGCTTATGATG TT	GACCCAGAAGA AAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTTtccccccggtttttgtttttttgttttgtagttgatattcac tgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcag gaga[g/a]gggagatgtgatggacttctataaaaccctaagaggaggagctactgtgaaggttt ctgcgtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggtt gattttccaaaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctc aatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagc agggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaac ctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgc ccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagg gccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacatt ttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLu1	GRL	T	G	F	V	cds	GE666	TGTGACTTTAG AGCTTATGATG TT	GACCCAGAAGA AAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTTtccccccggtttttgtttttttgttttgtagttgatattcac tgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcag gagaggggagatgtgatggacttctataaaaccctaagaggaggagctactgtgaaggtttctgc gtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggttgat[t/g]ttccaaaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctc aatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagc agggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaac ctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgc ccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagg gccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacatt ttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLu10	GRL	A	G	-	-	noncoding	GE1196	ATTCAAGGTGG CCAAATTAT	AAAGAAAACAA AAACATGTCC	ATTCAAGGTGGCCAAATTATttgtgtaatagaaaactgaaaatctaatattaaaaatatggaact tctaatatatttttatatttagttatagtttcagatatatatcatattggtattcactaatctgg gaagggaagggctactgcagctttacatgcaatttattaaaatgattgtaaaatagcttgtatag tgtaaaataagaatgatttttagatgagattgttttatcatgacatgttatatatttttgtagg ggtcaaagaaatgctgatggataacctatatgatttatagtttgtacatgcattcatacaggcag cgatggtctcagaaaccaaacagtttgctctaggggaagagggagatggagactggtcctgtgtg cagtgaaggttgctgaggctctgacccagtgagattacagaggaagttatcctctgcctcccatt ctgaccacccttctcattccaacagtgagtctgtcagcgcaggtttagtttactcaatctccccct tgcactaaagtatgtaaagtatgtaaacaggagacaggaaggtggtgcttacatccttaaaggca ccatctaatagcgggttactttcacatacagccctcccccagcagttgaatgacaacagaagctt cagaagtttggcaatagtttgcatagaggtaccagcaatatgtaaatagtgcagaatctcatagg ttgccaataatacactaattccttttct[a/g]tcctacaacaagagtttatttccaaataaaatg aGGACATGTTTTTGTTTTCTTT	802

FIG. 5CCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu11	GRL	A	C	-	-	noncoding	GE558	AAATATGTTTG AAGACCTGTGA A	AAATGATAAAT TTTTATAAGCT ACAGAG	AAATATGTTTGAAGACCTGTGAAactttaatagtgccttttattccatat[a/c]ggacagcaca attacctatgtgctggaaggaatgattgcatcatcgataaaattcgaagaaaaaactgcccagca tgccgctatcgaaaatgtcttcaggctggaatgaacctggaaggtaatataaatatctgaaagca attgtttgtCTCTGTAGCTTATAAAAATTTATCATTT	232
GRLu12	GRL	C	T	H	H	cds	GE565	CTTCTGAAGAG TGTTGCCTCAT	GGGAAAATGAC ACACATACAAC T	CTTCTGAAGAGTGTTGCCTCATaccttttatttctcttaattcaggtttcaggaacttaca[c/t] ctggatgaccaaatgaccctactgcagtactcctggatgtttcttatggcatttgctctggggtg gagatcatatagacaatcaagtgcaaacctgctgtgttttgctcctgatctgattattaatgagt aAGTTGTATGTGTGTCATTTTCCC	219
GRLu13	GRL	T	A	-	-	noncoding	GE1325	TGATCTGTCAA ACTTCCAGAAC C	TTGGCATTGCT GTAAATG	TGATCTGTCAAACTTCCAGAACCatggtagccttcagtgagatttccatcttggctggtcactcc ctgactgtagctgtaggtgaatgtgtttttgtgtgtgtgtgtctggttttagtgtcagaagggaa ataaaagtgtaaggaggacactt[t/a]aaacccttgggtggagtttcgtaatttcccagacta ttttcaagcaacctggtccacccaggattagtgaccaggttttcaggaaaggatttgcttctctc tagaaaatgtctgaaaggattttatttctgatgaaaggctgtatgaaaataccctcctcaaata acttgcttaactacatatagattcaagtgtgtcaatattctattttgtatattaaatgctatata atggggacaaatctatattatactgtgtatggcattattaagaagctttttcattatttttatc acagtaattttaaaatgtgtaaaaattaaaaccagtgactcctgtttaaaaataaaagttgtagt ttttttattcatgctgaataataatctgtagttaaaaaaaaagtgtctttttacctacgcagtgaa atgtcagactgtaaaaccttgtgtggaaatgtttaacttttatttttttcatttaaatttgctgtt ctggtattaccaaaccacacatttgtaccgaattggcagtaaatgttagcCATTTACAGCAATGC CAA	718
GRLu14	GRL	G	C	D	H	cds	GE1201	CAACGGTGGCA ATGTGAAA	AAGAAACAGGA AAAACACTGAT	CAACGGTGGCAATGTGAAAttgtataccacagaccaaagcacctttgacattttgcaggatttgg agttttcttctgggtccccaggtaaagagacgaatgagagtccttggagatcagacctgttgata gatgaaaactgtttgctttctcctctggcgggagaagacgattcattccttttggaaggaaactc gaatgaggactgcaagcctctcattttaccggacactaaacccaaaattaaggataatggagatc tggttttgtcaagccccagtaatgtaacactgccccaagtgaaaacagaaaaagaagatttcatc gaactctgcacccctggggtaattaagcaagagaaactgggcacagtttactgtcaggcaagctt tcctggagcaaatataattggtaataaaatgtctgccatttctgttcatggtgtgagtacctctg gaggacagatgtaccactatgacatgaatacagcatccctttctcaacagcag[g/c]atcagaa gcctatttttaatgtcattccaccaattcccgttggttccgaaaattggaataggtgccaaggat ctggagatgacaacttgacttctctggggactctgaacttccctggtcgaacagtttttctaat ggctattcaaggtaagATCAGTGTTTTTCCTGTTTCTT	688
GRLu15	GRL	C	A	-	-	noncoding	GE664	GCATTTTTGAT TTATGCATGG	GAGGAATTACT TTGTCTGATTA AAA	GCATTTTTGATTTATGCATGGaaacctgaaaaaaagtttacaagtgtatatcagaaaagggaagt tgtgccttttatagctattactgtctggttttaacaatttccttttatatttagtgaactacgctt gctcatttttttcttacataatttttttattcaagttattgtacagctgtttaagatgggcagctag ttcgtagctttcccaaataaactctaaacattaatcaatcatctgtgtgaaaatgggttggtgct tctaacctgatggcacttagctatcagaagaccacaaaaattgactcaaatctccagtattcttg tcaaaaaaaaaaaaaaaaaagctcatattttgtatatatctgcttcagtggagaattatataggt tgtgcaaattaacagtcctaa[c/a]tggtatagagcacctagtccagtgacctgctgggtaaac tgtggatgatggttgcaaaagactaatttaaaaaataactaccaagaggccctgtctgtacctaa cgccctatttttgcaatggctatatggcaagaaagctggtaaactatttgtctttcaggacctttt tgaagtagtttgtataacttcttaaaagttgtgattccagataaccagctgtaacacagctgaga gacTTTTAATCAGACAAAGTAATTCCTC	678

FIG. 5DDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu16	GRL	G	T	-	-	noncoding	GE1325	TGATCTGTCAA ACTTCCAGAAC C	TTGGCATTGCT GTAAATG	TGATCTGTCAAACTTCCAGAACCatggtagccttcagtgagatttccatcttggctggtcactcc ctgactgtagctgtaggtgaatgtgtttttgtgtgtgtgtgtctggttttagtgtcagaagggaa ataaaagtgtaaggaggacactttaaaccctttgggtggagtttcgtaatttcccagactatttt caagcaacctggtccacccaggattagtgaccaggttttcaggaaaggatttgcttctctctaga aaatgtctgaaag[g/t]attttatttttctgatgaaaggctgtatgaaaataccctcctcaaata acttgcttaactacatatagattcaagtgtgtcaatattctatttttgtatattaaatgctatata atggggacaaatctatattatactgtgtatggcattattaagaagctttttcattatttttttatc acagtaattttaaaatgtgtaaaaattaaaaccagtgactcctgtttaaaaataaaagttgtagt ttttttattcatgctgaataataatctgtagttaaaaaaaaagtgtctttttacctacgcagtgaa atgtcagactgtaaaaccttgtgtggaaatgtttaacttttatttttttcatttaaatttgctgtt ctggtattaccaaaccacacatttgtaccgaattggcagtaaatgttagcCATTTACAGCAATGC CAA	718
GRLu2	GRL	A	G	N	S	cds	GE1201	CAACGGTGGCA ATGTGAAA	AAGAAACAGGA AAAACACTGAT	CAACGGTGGCAATGTGAAAttgtataccacagaccaaagcacctttgacattttgcaggatttgg agttttcttctgggtccccaggtaaagagacgaatgagagtccttggagatcagacctgttgata gatgaaaactgtttgctttctcctctggcgggagaagacgattcattccttttggaaggaaactc gaatgaggactgcaagcctctcattttaccggacactaaacccaaaattaaggataatggagatc tggttttgtcaagccccagtaatgtaacactgccccaagtgaaaacagaaaaagaagatttcatc gaactctgcacccctggggtaattaagcaagagaaactgggcacagtttactgtcaggcaagctt tcctggagcaaatataattggtaataaaatgtctgccatttctgttcatggtgtgagtacctctg gaggacagatgtaccactatgacatgaatacagcatccctttctcaacagcaggatcagaagcct atttttaatgtcattccaccaattcccgttggttccgaaa[a/g]ttggaataggtgccaaggat ctggagatgacaacttgacttctctggggactctgaacttccctggtcgaacagttttttctaat ggctattcaaggtaagATCAGTGTTTTTCCTGTTTCTT	688
GRLu3	GRL	C	T	D	D	cds	GE621	CAGTGAGACCC TATCTATCTGA AAAA	CATACTTTGTC CCAGAAAACTC TT	CAGTGAGACCCTATCTATCTGAAAAAAaaaaaaaaaaaagaaaagaaaagaaaaagaaaatccttta actgacttcatcttaacctttttagttcctaagga[c/t]ggtctgaagagccaagagctatttga tgaaattagaatgacctacatcaaagagctaggaaaagccattgtcaagagggaaggaaactcca gccagaactggcagcggttttatcaactgacaaaactcttggattctatgcatgaagtaagtgtc aaacataaagccaaatatAAGAGTTTTCTGGGACAAAGTATG	302
GRLu4	GRL	T	C	N	N	cds	GE677	GACCAATTTGG AAGCCTGAT	CACAACTTCCC TTTTCTGATAT ACAC	GACCAATTTGGAAGCCTGATcattaccatatcttctcttgcaggtggttgaaaatctccttaact attgcttccaaacatttttggataagaccatgagtattgaattccccgagatgttagctgaaatc atcaccaatcagataccaaaatattcaaa[t/c]ggaaatatcaaaaaacttctgtttcatcaaa agtgactgccttaataagaatggttgccttaaagaaagtcgaattaatagcttttattgtataaa ctatcagtttgtcctgtagaggttttgttgttttatttttttattgttttcatctgttgttttgtt ttaaatacgcactacatgtggtttatagagggccaagacttggcaacagaagcagttgagtcgtc atcacttttcagtgatgggagagtagatggtgaaatttattagttaatatatcccagaaattaga aaccttaatatgtggacgtaatctccacagtcaaagaaggatggcacctaaaccaccagtgccca aagtctgtgtgatgaactttctcttcatactttttttcacagttggctggatgaaatttctaga ctttctgttggtgtatccccccccctgtatagttaggatagcatttttgatttatgcatggaaacc tgaaaaaaagtttacaaGTGTATATCAGAAAAGGGAAGTTGTG	693

FIG. 5EEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu5	GRL	T	C	-	-	noncoding	GE671	TGATTCCAGAT AACCAGCTGTA AC	GCATTTCTTTG ACCCCTACAA	TGATTCCAGATAACCAGCTGTAACacagctgagagacttttaatcagacaaagtaattcctctca ctaaactttacccaaaaactaaatctctaatatggcaaaaatggctagacacccattttcacatt cccatctgtcaccaattggttaatctttcctgatggtacaggaaagctcagctactga[t/c]tt ttgtgatttagaactgtatgtcagacatccatgtttgtaaaactacacatccctaatgtgtgcca tagagtttaacacaagtcctgtgaatttcttcactgttgaaaattattttaaacaaaatagaagc tgtagtagccctttctgtgtgcaccttaccaactttctgtaaactcaaaacttaacatatttact aagccacaagaaatttgatttctattcaaggtggccaaattatttgtgtaatagaaaactgaaaa tctaatattaaaaatatggaacttctaatatatttttatatttagttatagtttcagatatatat catattggtattcactaatctgggaagggaagggctactgcagctttacatgcaatttattaaaa tgattgtaaaatagcttgtatagtgtaaaataagaatgatttttagatgagattgttttatcatg acatgttatatatttttTTGTAGGGGTCAAAGAAATGC	687
GRLu6	GRL	A	G	-	-	noncoding	GE1325	TGATCTGTCAA ACTTCCAGAAC C	TTGGCATTGCT GTAAATG	TGATCTGTCAAACTTCCAGAACCatggtagccttcagtgagatttccatcttggctggtcactcc ctgactgtagctgtaggtgaatgtgtttttgtgtgtgtgtgtctggttttagtgtcagaagggaa ataaaagtgtaaggaggacactttaaacccttgggtggagtttcgtaatttcccagactatttt caagcaacctggtccacccaggattagtgaccaggttttcaggaaaggatttgcttctctctaga aaatgtctgaaaggattttatttttctgatgaaaggctgtatgaaaataccctcctcaaataactt gcttaactacatatagattcaagtgtgtcaatattctattttgtatattaaatgctatataatgg ggacaaatctatattatactgtgtatggcattattaagaagctttttcattatttttttatcacag taatttttaaaatgtgtaaaaattaaaaccagtgactcctgtttaaaaataaaagttgtagttttt tattcatgctgaataataatctgtagttaaaaaaaaaagtgtctttttacctacgcagtgaaatgt cagactgtaaaaccttgtgtggaaatgtttaacttttatttttttc[a/g]tttaaatttgctgtt ctggtattaccaaaccacacatttgtaccgaattggcagtaaatgttagcCATTTACAGCAATGC CAA	718
GRLu7	GRL	A	G	P	P	cds	GE666	TGTGACTTTAG AGCTTATGATG TT	GACCCAGAAGA AAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTttcccccggtttttgtttttgttttgtagttgatattcac tgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcag gagaggggagatgtgatggacttctataaaaccctaagaggaggagctactgtgaaggtttctgc gtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggttgatt ttcc[a/g]aaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctc aatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagc agggccaaatcagcctttcctcgggggaaacagacttaaagctttggaagaaagcattgcaaac ctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgc ccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagg gccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacatt ttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLuß	GRL	C	T	P	P	cds	GE1201	CAACGGTGGCA ATGTGAAA	AAGAAACAGGA AAAACACTGAT	CAACGGTGGCAATGTGAAAttgtataccacagaccaaagcacctttgacatttlgcaggatttgg agttttcttctgggtccccaggtaaagagacgaatgagagtccttggagatcagacctgttgata gatgaaaactgtttgctttctcctctggcgggagaagacgattcattccttttggaaggaaactc gaatgaggactgcaagcctctcatttttaccggacactaaacccaaaattaaggataatggagatc tggttttgtcaagccc[c/t]agtaatgtaacactgccccaagtgaaaacagaaaaagaagattt catcgaactctgcacccctggggtaattaagcaagagaaactgggcacagtttactgtcaggcaa gctttcctggagcaaatataattggtaataaaatgtctgccatttctgttcatggtgtgagtacc tctggaggacagatgtaccactatgacatgaatacagcatccctttctcaacagcaggatcagaa gcctatttttaatgtcattccaccaattcccgttggttccgaaaattggaataggtgccaaggat ctggagatgacaacttgacttctctggggactctgaacttccctggtcgaacagtttttctaat ggctattcaaggtaagATCAGTGTTTTTCCTGTTTCTT	688

FIG. 5FFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu9	GRL	G	A	-	-	noncoding	GE664	GCATTTTTGAT TTATGCATGG	GAGGAATTACT TTGTCTGATTA AAA	GCATTTTTGATTTATGCATGGaaacctgaaaaaaag taaagtttacaagtgtatatcagaaaaaggaagt	678
HSD3B1 d1	HSD3B 1	C	T	V	V	cds	GE593	GCCAGATACAG AAATCATTCCA A	TAATTCCCCAC CTTGCTGC	tgtgcctttatagctattactgtctggtttaaca gttattgtacagctgtttaaatgggcagcttag ttcgtagctttcccaaataaacttcttaaacattaatc tcttaacctgatg[g/a]cacttagctatcagaagac cttgtcaaaaaaaaaaaaaaaaagctcatatttttg aggttgtgcaaattaacagtcctaactggtatagag tgtggatgatggttgcaaagactaatttaaaaaat cgccctatttttgcaatggctatatggcaagaaagc tgaagtagtttgtataacttcttaaaagttgtgatt gacTTTTAATCAGACAAAGTAATTCCTC	257
HSD3B1 d2	HSD3B 1	C	G	I	V	cds	GE593	GCCAGATACAG AAATCATTCCA A	TAATTCCCCAC CTTGCTGC	GCCAGATACAGAAATCATTCCAAtgacctgacctgt gctgacagtgctggaaggagacatttctggatgagcc /t]tcggtcatccacaccgccctgtatcattgat catgaatgtcaatgtgaaaggtatggtaggctgggg	257
HSD3B1 d3	HSD3B 1	T	A	G	G	cds	GE593	GCCAGATACAG AAATCATTCCA A	TAATTCCCCAC CTTGCTGC	GCCAGATACAGAAATCATTCCAAtgacctgacctgt gctgacagtgctggaaggagacatttctggatgagcc cggtcatccacaccgccctgtatcattgatgtcct catgaatgtcaatgtgaaaggtatggtaggctgggg	257
HSD3B1 d4	HSD3B 1	C	T	L	L	cds	GE668	GAGCTTCCTAC TCAGGCCAA	GGAGAAAGGAG GAAAGTATGTA T	GAGCTTCCTACTCAGGCCAAtttacacctatcgacc caaatagcgtatttcacctttctcttataagaaggctc ctacagctgggaggaagccaagcagagcagaaaacgtgga aggagaccctgaagtccaagactcagtgatttaagga aggagatgtcatcaagctcccaccctccctggccttcat tcctgctgcctccctttcatacaatggccaacttatc agtcattggccccaacaagaaggtttctgtccctaatc ctgttaccaaatctcagtagctgattctgaacaatttc tgactactagagcttttcctactcttaaatgagaaa gttatgttaATACATACTTTCCTCCTTTCTCC	682
HSD3B1 d5	HSD3B 1	G	T	-	-	noncoding	GE668	GAGCTTCCTAC TCAGGCCAA	GGAGAAAGGAG GAAAGTATGTA T	GAGCTTCCTACTCAGGCCAAtttacacctatcgacc caaatagcgtatttcacctttctcttataagaaggctc agctgggaggaagccaagcagagcagaaaacgtggagtgg gaccctgaagtccaagactcagtgatttaaggatga /t]agatgtcatcaagctcccaccctccctggccttcat tcctgctgcctccctttcatacaatggccaacttatc agtcattggcccaacaagaaggtttctgtcctaatc ctgttaccaaatctcagtagctgattctgaacaatttc tgactactagagcttccattcacttcttaaatgaga tccttcacatagtttgataaaaagatcaataaatgt gttatgttaATACATACTTTCCTCCTTTCTCC	682

FIG. 5GGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Reverse Primer (5' -> 3')	Forward Primer (5' -> 3')	Assay Sequence	
HSD3B1 d6	HSD3B 1	T	C	F	L	cds	GE675	GGGCGGTCGAT AGGTGTAAA	GGTTGGCACCT CTTAGGGATA	GGTTGGCACCTCTTAGGGATAtatgctcttcatggacaggtacccagc tcctgttagaggcctgtgtccaagctagtgtgccagtcttc gccgggcccaactcctacaaggaaatcatccagaatggcca atggcccgctccataccacacagcaaaaagcttgctgagga ggaatctgaaaaacggcggcaccctgtacacttgtgccttac ggaagccgattccttctgctagtataaacgaggccctgaa tggaaagttctccactgttaacccagtctatgttggcaatg tgagggccctgcaggacccaagaaggcccaagcatccga gacacgcctcaccaaagctatgataaccttaattacaccct tgattccagatggagcct/c]ttcctttatcccctgatgtat gtgagcttcctacaggccaaTTTACACCTATCGACCGCC	692
HSD3B1 d25	HSD3B 2	G	A	A	A	cds	GE1194	GCCAGATCTCG CTGAGCC	CAGAAGAATGC ACCCTGAGTC	CAGAAGAATGCACCCTGAGTCtataacaaccacacaccaccga gcgcagcaggtggcagcacctccgggagaatacctcctcacaac tacccagcctactgttggaggccctgtgtccaagccagtgtgc tagagggtagccgggcccaacttcctacaaggaaatcctccag gaaaacacatggcccactccataccgtacagcaaaaagct ajgctaatgggtggaatctaaaaaatggtgataccttgtac atctatgggaaggagggcccattccttctgccagtataaa cctgtcaagtgttggaaagttctccacagtcaacccagtct acattctggccttgagggccctgcaggaccccaagaaggcc tacatcttcagatgacacgcctccaccaaagctatgataacct cggcctccgccttgattccagatggagccttcctttaaccc tggaaatagtgagcttcctactcagcccaatttacacctat gtcacattatcaaatagcgtattcaccttctcttacaagaa	839
HSD3B2 d26	HSD3B 2	A	G	T	T	cds	GE1194	GCCAGATCTCG CTGAGCC	CAGAAGAATGC ACCCTGAGTC	CAGAAGAATGCACCCTGAGTCtataacaaccacacaccaccga gcgcagcaggtggcagcacctccgggagaatacctcctcacaac tacccagctactgttggaggccctgtgtccaagccagtgtgc tagaggtagccgggcccaacttcctacaaggaaatcatccag gaaaacacatggcccactccataccgtacagcaaaaagct taatgggtggaatcttaaaaaatggtgatacctttgtacactt atctatgggaaggagggcccattccttctgccagtataaa cctgtcaagtgttggaaagttctccacagtcaacccagtct acattctggccttgagggccctgcaggaccccaagaaggcc tacatcttcagatgacacgcctccaccaaagctatgataacct cggccttccgccttgattccagatggagccttcctttaaccc tggaaatagtgagcttcctactcagcccaatttacacctat gtcacattatcaaatagcgtattcaccttctcttacaagaa	839
HSD3B2 d27	HSD3B 2	C	T	-	-	noncoding	GE639	CCATGCAGAGT TTAAGATGGAG	AAAATAAGGCA TCTGCTGAGTG TAT	AAAATAAGGCATCTGCTGAGTGTATaaccatttacctctt gctagaatcagatctgctctccagcatctttctgttttccttgg ggattggccacgatgacgggctggagctgccttgtgacagg gatcgtccgcctgttggtggaagagaaggaactgaaggaga gaccagaattgagagaggaggaatttctagtaagtaaacttga AAACTCTGCATGG	338

FIG. 5HHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 d28	HSD3B 2	C	G	-	-	*noncoding*	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccctcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccctaaactg aagggccctttgactaatagagctccatttccact[c/g]ttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 d29	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccctcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccctaaactg aagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u1	HSD3B 2	C	G	R	R	cds	GE639	AAAATAAGGCA TCTGCTGAGTG TAT	CCATGCAGAGT TTAAGATGGAG	AAAATAAGGCATCTGCTGAGTGTATaaccattttacctcttgtttttagccctcttctgggtcac gctagaatcagatctgctctccagcatcttctgtttcctggcaagtgtttcctgctactttggat tggccacgatgacgggctggagctgccttgtgacaggagcaggagggcttctgggtcagaggatc gtccg[c/g]ctgttggtggaagagaaggaactgaaggagatcagggccttggacaaggccttca gaccagaattgagagaggaattttctagtaagtaaacttgagtcatgggtctgtggCTCCATCTT AAACTCTGCATGG	338
HSD3B2 u10	HSD3B 2	A	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccctcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagt[a/g]gctgattctgaacaattgagggacccctaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5IIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u11	HSD3B 2	A	G	Q	R	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagca tagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctg gaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctggcggc taatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatatatct atggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggatcctg tcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggcccacat tctggccttgagggccctgc[a/g]ggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u12	HSD3B 2	C	G	T	T	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaac[c/g]gtggagtgggttggttccc ttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtg catgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaa gggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u13	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggc[c/t]tcatacagaaagcaacaa gggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u14	HSD3B 2	A	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctc[a/g]tgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5JJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u15	HSD3B 2	C	T	-	-	*noncoding*	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaa[c/t]ctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttccttttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u16	HSD3B 2	A	C	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccccttaaactg aagggccctttgacta[a/c]tagagctccatttccactcttaaatgagaaagcatttccttttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u17	HSD3B 2	G	T	L	L	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctact[g/t]ttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagt agcatagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcc tctggaaaacacatggcccactccataccgtacagcaaaaagcttgctgagaaggctgtgctgg cggctaatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatat atctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaatttctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u18	HSD3B 2	C	T	L	L	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagat[c/t]t ggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttccc ttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtg catgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaa gggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttccttttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5KKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u19	HSD3B 2	G	A	G	S	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctcgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagca tagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctg gaaaacacatggcccactccataccgtacagcaaaaagcttgctgagaaggctgtgctggcggc taatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatatatct atggggaagga[g/a]gcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u2	HSD3B 2	T	G	I	S	cds	GE601	CCAGCCAGATC CAGAAATCTT	TCTGATCCTCA TTTAACCAACT TGT	CCAGCCAGATCCAGAAATCTTTccaatgacctgacctgtgttcacacagagctccagaacaggac caagctgactgtacttgaaggagaca[t/g]tctggatgagccattcctgaaaagagcctgccag gacgtctcggtcgtcatccacaccgcctgtatcattgatgtctttggtgtcactcacagagagtc catcatgaatgtcaatgtgaaaggtacagtagcctggggaggagataaaACAAGTTGGTTAAATG AGGATCAGA	269
HSD3B2 u20	HSD3B 2	G	A	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccag[g/a]tcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u21	HSD3B 2	G	C	E	Q	cds	GE601	CCAGCCAGATC CAGAAATCTT	TCTGATCCTCA TTTAACCAACT TGT	CCAGCCAGATCCAGAAATCTTTccaatgacctgacctgtgttcacacagagctccagaacaggac caagctgactgtacttgaaggagacattctggatgagccattcctgaaaagagcctgccaggacg tctcggtcgtcatccacaccgcctgtatcattgatgtctttggtgtcactcacaga[g/c]agtc catcatgaatgtcaatgtgaaaggtacagtagcctggggaggagataaaACAAGTTGGTTAAATG AGGATCAGA	269

FIG. 5LLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u22	HSD3B 2	G	A	Q	Q	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg taccca[g/a]ctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagt agcatagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcc tctggaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctgg cggctaatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatat atctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttctactcagcccaatttacacctatcaacccccctcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u23	HSD3B 2	C	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccctcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctatacagaaagcaacaagggc acaagcccaggtcctgctgcctcccctttcacacaatg[c/g]ccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u24	HSD3B 2	G	A	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccctcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctatacagaaagcaacaagggc acaagcccaggtcctgctgcctcccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcaca[g/a]tcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u3	HSD3B 2	C	T	V	V	cds	GE601	CCAGCCAGATC CAGAAATCTT	TCTGATCCTCA TTTAACCAACT TGT	CCAGCCAGATCCAGAAATCTTtccaatgacctgacctgtgttcacacagagctccagaacaggac caagctgactgtacttgaaggagaçattctggatgagccattcctgaaaagagcctgccaggacg t[c/t]tcggtcgtcatccacaccgcctgtatcattgatgtctttggtgtcactcacagagagtc catcatgaatgtcaatgtgaaaggtacagtagcctggggaggagataaaACAAGTTGGTTAAATG AGGATCAGA	269
HSD3B2 u4	HSD3B 2	A	G	R	G	cds	GE639	AAAATAAGGCA TCTGCTGAGTG TAT	CCATGCAGAGT TTAAGATGGAG	AAAATAAGGCATCTGCTGAGTGTATaaccattttacctcttgtttttagccctcttctgggtcac gctagaatcagatctgctctccagcatcttctgtttcctggcaagtgtttcctgctactttggat tggccacgatgacgggctggagctgccttgtgacaggagcaggagggcttctgggtcagaggatc gtccgcctgttggtggaagagaaggaactgaaggagatcagggccttggacaaggccttc[a/g] gaccagaattgagagaggaattttctagtaagtaaacttgagtcatgggtctgtggCTCCATCTT AAACTCTGCATGG	338

FIG. 5MMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u5	HSD3B 2	A	G	L	L	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggag gcgcagcaggtggcagcacctccgggagaatacctcacacaaccaca tacccagctactgttggaggcctgtgtccaagccagtgtgccagt tagaggtagccgggcccaactcctacaaggaaatcatccagaacg gaaacacatggcccactccataccgtacagcaaaaagcttgct taatgggtggaatctaaaaaatggtgataccttgtacacttgtgc atgggaaggaggcccattccttctgccagtataaatgaggccc tcaagtgttggaaagttctccacagtcaacccagtctatggtggc tctggccttgagggcccctgcaggaccccaagaaggccccaagcat tctcagatgacacgcctcaccaaagctatgataacctaatacaca ctccgccttgattccagatggagcctccttcctttaaccctgatgtac aatagtgagcttcctactcagccaatttacacctatcaaccccc catt[a/g]tcaaatagcgtattcaccttctcttacaagaaGGCT	GCTCTTTTTGT TGAACTGTGTG AA		627
HSD3B2 u6	HSD3B 2	C	A	T	N	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctta acacagtcacattatcaaatagcgtattcaccttcttcttacaaga tataagccactctacagctgggaggaagccaagcagaaaaccgtg ggaccggcacaaggaga[c/a]cctgaagtccaagactcagtgat catgtgggtattgttaggaaatgtcatcaaactcccaccctggcct tgggtattgttaggaaatgtcatcaaactcccaccctggcctc acaagcccaggtcctgctgcctc[c/t]ctttcacacaatgccca catcaaaacctgcacagtcactggcccaacaagaacgtttctgtc aaacaatatgatttgctgttaccaaatctcagtagctgattctga actgaagggcccttttgactaatagagctccattccactcttaa tctttaatctcccattCCTTCACACAGTTCAACAAAAGAGC	627
HSD3B2 u7	HSD3B 2	A	C	*	C	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctta acacagtcacattatcaaatagcgtattcaccttcttcttacaaga tataagccactctacagctgggaggaagccaagcagaaaaccgtg ggaccggcacaaggagaccctgaagtccaagactcagtg[a/c]t catgtgggtattgttaggaaatgtcatcaaactcccaccctggcct tgggtattgttaggaaatgtcatcaaactcccaccctggcctc acaagcccaggtcctgctgcctc[c/t]ctttcacacaatgccca catcaaaacctgcacagtcactggcccaacaagaacgtttctgtc aaacaatatgatttgctgttaccaaatctcagtagctgattctga actgaagggcccttttgactaatagagctccattccactcttaa tctttaatctcccattCCTTCACACAGTTCAACAAAAGAGC	627
HSD3B2 u8	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctta acacagtcacattatcaaatagcgtattcaccttcttcttacaaga tataagccactctacagctgggaggaagccaagcagaaaaccgtg ggaccggcacaaggagaccctgaagtccaagactcagtgatttaa tgggtattgttaggaaatgtcatcaaactcccaccctggcctc acaagcccaggtcctgctgcctc[c/t]ctttcacacaatgccca catcaaaacctgcacagtcactggcccaacaagaacgtttctgtc aaacaatatgatttgctgttaccaaatctcagtagctgattctga actgaagggcccttttgactaatagagctccattccactcttaa tctttaatctcccattCCTTCACACAGTTCAACAAAAGAGC	627

FIG. 5NNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u9	HSD3B 2	T	C	-	-	*noncoding*	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccctttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgc[t/c]gttaccaaatctcagtagctgattctgaacaattgagggacccctaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HTR1Ad 9	HTR1A	G	A	V	V	cds	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatgga cagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggcc aactccagtttcccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcctgaa agctgctcctcggagataccttcgccgaagcagtaagaacttcctgcttgggtctctgcattcc cttcctccgaaacttcccaggagaagggcggaagaccccaggggaaggggcgaggcgaatcttcg cgctgcttttttcttcctcccccttcccgcgccgggcgcgcaggcatggatgtgctcagccctgg tcagggcaacaacaccacatcaccaccggctccctttgagaccggcggcaacactactggtatct ccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctgcgcg gtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtggccaa ttatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatggccg cgctgtatcaggt[g/a]ctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgc cctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtact gggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatc tcgctcacTTGGCTTATTGGCTTCCTCA	873
HTR1Au 1	HTR1A	C	T	A	V	cds	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatgga cagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggcc aactccagtttcccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcctgaa agctgctcctcggagataccttcgccgaagcagtaagaacttcctgcttgggtctctgcattcc cttcctccgaaacttcccaggagaagggcggaagaccccaggggaaggggcgaggcgaatcttcg cgctgcttttttcttcctcccccttcccgcgccgggcgcgcaggcatggatgtgctcagccctgg tcagggcaacaacaccacatcaccaccggctccctttgagaccggcggcaacactactggtatct ccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctgcg[c /t]ggtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtgg ccaattatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatg gccgcgctgtatcaggtgctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgc cctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtact gggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatc tcgctcacTTGGCTTATTGGCTTCCTCA	873

FIG. 50000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Au 2	HTR1A	G	C	L	F	cds	GE1180	TGCGCTCATCT CGCTCA	GCATAGTGAAT GGGACGGAT	TGCGCTCATCTCGCTCActtggcttattggcttcctcatctctatcccgcccatcctgggctggc gcaccccggaagaccgctcggaccccgacgcatgcaccattagcaaggatcatggctacactatc tattccacctttggagctttctacatcccgctgctgctcatgctggttctctatgggcgcatatt ccgagctgcgcgcttccgcatccgcaagacggtcaaaaaggtggagaagaccggagcggacaccc gccatggnnnagcatctcccgccccgcagcccaagaagagtgtgaatggagagtcggggagcagg aactggaggctgggcgtggagagcaaggctgggggtgctctgtgcgccaatggcgcggtgaggca aggtgacgatggcgccgccctggaggtgatcgaggtgcaccgagtgggcaactccaaagagcact tgcctctgcccagcgaggctggtcctacccctttgtgcccccgcctctttcgagaggaaaaatgag cgcaacgccgaggcgaagcgcaagatggccctggcccgagagaggaagacagtgaagacgctggg catcatcatgggcaccttcatcctctgctggctgcccttcttcatcgtggctcttgttctgccct tctgcgagagcagctgccacatgcccaccctgtt[g/c]ggcgccataatcaattggctgggcta ctccaactctctgcttaaccccgtcatttacgcatacttcaacaaggactttcaaaacgcgttta agaagatcattaagtgtaacttctgccgccagtgatgacggaggagtagccggccagtcgaggct acaggATCCGTCCCATTCACTATGC	870
HTR1Au 3	HTR1A	C	T	-	-	noncoding	GE1179	CCCTGAGGGAG TAAGGC	GGCTGCCGGAG CTGGAG	CCCTGAGGGAGTAAGGCtggactgttagatgatagcggaggtaccgttttgttgttgttgtcgtc gttgttcgtttgtttttggagacggagtctcgctctgt[c/t]gcccaggctggagtgcaatggc gcgagaacggaggtagcttttaaaaacgaagacacactcggtcttcttccatcaattagcaata attgggagactgacccaggactgttcaccttcccattcaggctccctatgcttccttttctcatc tcctattgccactctgggatgctgacacgatttaagaatttggcagataatatgacccaaggagt agttggaattccctccccaagtttttccaaccccagttttgctgggttggaggcggagtttatt tgttacaaccttggtctgaccggcagggacctggtgtgtgtaagtgagttctgagtctctgttga caaaaagagactcgaatgcaaagacgctgagctagagggagaggagggcggggacccagaggaaa gaggcactcctcggggttggggaagtattaggaggggagggttagagtgggagggaaggagctcg ctttcgaagcgactcacagagggataaataaagggaagtgaggaggaagagggagacttaaaggg aaggcaggtggggagaaggggacgaaagaggcagaagagagaagaggaggagagaggggg agagagggaaggaaggaaatagcgagaggagggtcacagagtgaccgtggaggatggggcttctc ggttctagatatttctgtgattggagactgtttgctagtggggagaCTCCAGCTCCGGCAGCC	843
HTR1Au 4	HTR1A	C	T	-	-	noncoding	GE1179	CCCTGAGGGAG TAAGGC	GGCTGCCGGAG CTGGAG	CCCTGAGGGAGTAAGGCtggactgttagatgatagcggaggtaccgttttgttgttgttgtcgtc gttgttcgtttgtttttggagacggagtctcgctctgtcgcccagg[c/t]ggagtgcaatggc gcgagaacggaggtagcttttaaaaacgaagacacactcggtcttcttccatcaattagcaata attgggagactgacccaggactgttcaccttcccattcaggctccctatgcttccttttctcatc tcctattgccactctgggatgctgacacgatttaagaatttggcagataatatgacccaaggagt agttggaattccctccccaagtttttccaaccccagttttgctgggttggaggcggagtttatt tgttacaaccttggtctgaccggcagggacctggtgtgtgtaagtgagttctgagtctctgttga caaaaagagactcgaatgcaaagacgctgagctagagggagaggagggcggggacccagaggaaa gaggcactcctcggggttggggaagtattaggaggggagggttagagtgggagggaaggagctcg ctttcgaagcgactcacagagggataaataaagggaagtgaggaggaagagggagacttaaaggg aaggcaggtggggagaaggggacgaaagaggcagaagagagaagaggaggagagaggggg agagagggaaggaaggaaatagcgagaggagggtcacagagtgaccgtggaggatggggcttctc ggttctagatatttctgtgattggagactgtttgctagtggggagaCTCCAGCTCCGGCAGCC	843

FIG. 5PPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR1Au 5	HTR1A	C	G	-	-	noncoding	GE1179	CCCTGAGGGAG TAAGGC	GGCTGCCGGAG CTGGAG	843 CCCTGAGGGAGTAAGGCtggactgttagatg gttgttcgtttgttttggagacggagtctc gaacggaggtagctttttaaaaa[c/g]gaa attgggagactgacccaggactgttcacctt tcctattgccacctcgggatgctgacacgat agttggaatttcccctccccaagtttttcaa tgttacaaccttggtctgaccggcagggacc caaaaagagactcgaatgcaaagacgctgag gaggcactcctcgggttgggaagtattag ctttcgaagcgactcacagagggataaataa aaggcaggtgggagaagggggacgaaagag agagaggaaggaaggaaatagcgagaggag ggttctagatatttctgtgattggagacttgt tcggctccacTTGGCTTATTGGCTTCCTCA
HTR1Au 6	HTR1A	C	T	-	-	noncoding	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	873 GACTGTTTGCTAGTGGGGAGActccagctcc cagcgacagacagacgttccagccaccttctc aactccagtttcccagcctggagctttctgaac agctgctcctcggagataccctttcgccgaag cttcctccgacgtgaccgtcagctaccaagtga ttcgcgctgctttttcttccctcccctttcc ctggtcagggcaacaacaccacatcaccacc atcttccgacgtgctgctgcacctcatccatc cgctgcttttttcttccctcccctttcccgc gccgctgtatcagggtgctcaccacctacgtga tcgctcacTTGGCTTATTGGCTTCCTCA
HTR1Au 7	HTR1A	G	C	A	P	cds	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	873 GACTGTTTGCTAGTGGGGAGActccagctcc cagcgacagacagacgttccagccaccctctc aactccagtttcccagcctggagctttctgaac agctgctcctcggagataccctttcgccgaag cttcctccgaaacttcccaggagaagggcgg cgctgctttttcttccctcccctttcccgc tcagggcaacaacaccacatcaccaccg[g/t] atcttccgacgtgaccgtcagctaccaagtga cgcggtyctgggcaatgcgtgcgtggtggct ccaattatcttattggctcttgggcggtcac gccgcgctgtatcaggtgctttgggcggtcac gggccatcacggaccccatcgactacgtgaa tcgctcacTTGGCTTATTGGCTTCCTCA

FIG. 5QQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR1AuB	HTR1A	C	A	-	-	noncoding	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	873 GACTGTTTGCTAGTGGGGAGActccagctcc cagcgacagacagacgttccagccacctctc aactccagttt[c/a]ccagctggagcttct tgaaagctgctcctcggagatacccttcgcc ttcccttcctccgaaacttcccaggagaagg ttcgcgctgctttttcttcctcccccttcc ctggtcagggcaacaaccacccacaccacc atctccgacgtgaccgtcagctaccaagtga cgcggtgctgggcaatgcgtgcgtggtggct ccaattatcttattggctcttttggcggtcac gccgcgctgtatcaggtgctcaacaagtgga cctcgacgtgctgctgcacctcatccatc gggccatcacggaccccatcgactacgtgaa tcgctcacTTGGCTTATTGGCTTCCTCA
HTR1DBu1	HTR1DB	G	C	V	V	cds	GE1318	GCCCTTCTTCT GGCGTC	CCTACCTGTGG AACCAGACA	698 GCCCTTCTTCTGGCGTCaggctaaggcgaa acatccctctacacggtctacttcccacggtggg ctcttatggccgcatctacgtagaagcccgct caagcgcttgacccgagcccagctgataacc ttaactcgcgggttcccgacgtgcccagcga caaagtgcgagtctccgacgccctgctggaa ccaccaagaccctagggatcatttgggagc tccctagtgatgcctatctgcaaagatgcct atggctgggctatcctcaactccctcatcaac aacaagcattccataaactgatacgttttaa gcctaagcgaccttgggaccaagttgTGT
HTR1DBu2	HTR1DB	G	A	-	-	noncoding	GE1318	GCCCTTCTTCT GGCGTC	CCTACCTGTGG AACCAGACA	698 GCCCTTCTTCTGGCGTCaggctaaggccgaa acatccctctacacggtctacttcccacggtggg ctcttatggccgcatctacgtagaagcccgct caagcgcttgacccgagcccagctgataacc ttaactcgcgggttcccgacgtgcccagcga gtgcgagtctccgacgccctgctggaaaaga caagaccctagggatcatttgggagccttt tagtgatgccttatctgcaaagatgcctgctg ctgggctatctccaactccctcatcaacccca agcattccataaactgatacgtttaagtgc gcctaagcgaccttgggaccaagttgTGT

FIG. 5RRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1DBu3	HTR1DB	C	T	S	S	cds	GE1163	CTTCGTCCGCTCCATGCC	CACCACGCATTCCGACA	CTTCGTCCGCTCCATGCCcaagagctgcgctccggagctggggcgaggagagccatggaggaacc gggtgctcagtgcgctccaccgccgcccgcgggctccgagacctgggttcctcaagccaacttat cctctgctccctcccaaaactgcagcgccaaggactacatttaccaggactc[c/t]atctccct accctggaaagtactgctggttatgctattggcgctcatcaccttggccaccacgctctccaatg cctttgtgattgccacagtgtaccggacccggaaactgcacaccccggctaactacctgatcgcc tctctggcggtcaccgacctgcttgtgtccatcctggtgatgcccatcagcaccatgtacactgt caccggccgctggacactgggccaggtggtctgtgacttctggctgtcgtcggacatcacttgtt gcactgcctccatcctgcacctctgtgtcatcgccctggaccgctactgggccatcacggacgcc gtggagtactcagctaaaaggactcccaagagggcggcggtcatgatcgcgctggtgtgggtctt ctccatctctatctcgctgccgcccttcttctggcgtcaggctaaggccgaagaggaggTGTCGG AATGCGTGGTG	661
HTR1DBu4	HTR1DB	T	G	V	G	cds	GE1163	CTTCGTCCGCTCCATGCC	CACCACGCATTCCGACA	CTTCGTCCGCTCCATGCCcaagagctgcgctccggagctggggcgaggagagccatggaggaacc gggtgctcagtgcgctccaccgccgcccgcgggctccgagacctgggttcctcaagccaacttat cctctgctccctcccaaaactgcagcgccaaggactacatttaccaggactccatctccctaccc tggaaagtactgctggttatgctattggcgctcatcaccttggccaccacgctctccaatgcctt tgtgattgccacagtgtaccggacccggaaactgcacaccccggctaactacctgatcgcctctc tggcggtcaccgacctgcttgtgtccatcctggtgatgcccatcagcaccatgtacactgtcacc ggccgctggacactgggccaggtgg[t/g]ctgtgacttctggctgtcgtcggacatcacttgtt gcactgcctccatcctgcacctctgtgtcatcgccctggaccgctactgggccatcacggacgcc gtggagtactcagctaaaaggactcccaagagggcggcggtcatgatcgcgctggtgtgggtctt ctccatctctatctcgctgccgcccttcttctggcgtcaggctaaggccgaagaggaggTGTCGG AATGCGTGGTG	661
HTR1Du1	HTR1D	G	C	V	L	cds	GE1162	TTGAAGGAAGGAGCCAAATG	TGTAGGAGATCTGAGAGGTGTTCA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccaca[g/c]tcctctccaatgcctttgtactcaccaccatcttactcaccagga agctccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatc ttggtaatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtg tgacatctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctggccatctccatctgcatctccatccccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du10	HTR1D	C	T	S	L	cds	GE1161	AGGAGGAGATGTCGGACTGT	ATCCCGATGAGGTTACAGGA	AGGAGGAGATGTCGGACTGTctggtgaacacctctcagatctcctacaccatctactccacctgt ggggccttctacattccctcggtgttgctcatcatcctatatggccggatctaccgggctgcccg gaaccgcatcctgaatccaccctcactctatgggaagcgcttcaccacggcccacctcatcacag gctctgccgggtcctcgctctgctcgctcaactccagcctccatgaggggcact[c/t]gcactc ggctggctcccctctctttttcaaccacgtgaaaatcaagcttgctgacagtgccctggaacgca agaggatttctgctgctcgagaaaggaaagccactaaaatcctgggcatcattctgggggccttt atcatctgctggctgccctttcttcgtggtgtctctggtcctccccatctgccgggactcctgctg gatccacccggcgctctttgacttcttcacctggctaggctatttaaactccctcatcaatccaa taatctacactgtgtttaatgaagagtttcggcaagcttttcagaaaattgtccctttccggaag gcctcctagtcttattcggtgatgacgcaaagaaactttgtgTCCTGTAACCTCATCGGGAT	648

FIG. 5SSSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR1Du 11	HTR1D	C	A	A	D	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggt gaaccagtcagcagaaggccttccccagg cagaggcttcagcagaaggccttccccagg atcacactggccacagtcctcctccaatgc ccacacccctgccaactacctgattggct taatgcccatcagcatcgcctataccatc atctggctgtccctgacatcacgtgctg ctctggacaggtactgggcaatccacagat gcggccaccatgatcgccattgtcctgggc gcggcaggccaaggcccaggaggagatgt
HTR1Du 2	HTR1D	T	C	H	H	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggt gaaccagtcagcagaaggccttccccagg cagaggcttcagcagaaggccttccccagg atcacactggccacagtcctcctccaatgc ccacacccctgccaactacctgattggct taatgcccatcagcatcgcctataccatc atctggctgtccctgacatcacgtgctg ctctggacaggtactgggcaatccacagat gcggccaccatgatcgccattgtcctgggc gcggcaggccaaggcccaggaggagatgt
HTR1Du 3	HTR1D	T	C	A	A	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggt gaaccagtcagcagaaggccttccccagg cagaggcttcagcagaaggccttccccagg atcacactggccacagtcctcctccaatgc ccacacccctgccaactacctgattggct taatgcccatcagcatcgcctataccatc atctggctgtccctgacatcacgtgctg c]ctggacaggtactgggcaatccacagat gcggccaccatgatcgccattgtcctgggc gcggcaggccaaggcccaggaggagatgt
HTR1Du 4	HTR1D	T	C	N	N	cds	GE1161	AGGAGGAGATG TCGGACTGT	ATCCCGATGAG GTTACAGGA	AGGAGGAGATGTCGGACTGTctggtgaac ggggccttctacatccctcggttgttgct gaaccgcatcctgaatccacccctcactct gctctgccgggtcctcgctctgctcgctc ggctcccctctcttttcaaccacgtgaa gatttctgctgctcgagaaaggaaagcca tctgctggctgcctcttctcgtggtgtct cacccggcgctctttgacttcttcacctg ctacactgtgtttaa[t/c]gaagagttt gcctcctagtcttattcggtgatgacgca

FIG. 5TTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Du 5	HTR1D	A	G	T	T	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcac[a/g]ctggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccagga agctccacaccccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatc ttggtaatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtg tgacatctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatccccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 6	HTR1D	T	C	I	I	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacaccccctgccaactacctgat[t/c]ggctccctggccaccaccgacctcttggtttccatc ttggtaatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtg tgacatctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatccccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 7	HTR1D	C	G	S	S	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacaccccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtc[c/g]tctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatccccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 8	HTR1D	A	C	A	A	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacaccccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattgctct ggacaggtactgggc[a/c]atcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatccccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650

FIG. 5UUUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR1Du9	HTR1D	G	T	R	R	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtggaagagagagc gaaccagtcagcagaaggcctcccaggaggcctccaacagatcc cagaggcttgggatcccaggaccctccaggcgctcaagatctccct atcacactggccacagtcctctccaatgccttgtactcaccacca ccacaccctgccaactacctgattggctccctggccaccaccgac taatgcccatcagcatcgcctataccatcacccacacctggaacct atcttggctgtcctctgacatcacgtgctgcacagcctccatcctgc ggacaggtactgggcaatcacagatgccctggaatacagtaaacgc ccaccatgatcgccattgtcctgggccatcctccatcctgcatcctcat g/t]caggccaaggcccaggaggagatgtcggactgtctggTGAAC
HTR1EL u1	HTR1E L	C	T	I	I	cds	GE1160	TTCCCTTGTTA CAGGTATCCAT	GTGGGATGTAG AAAGCTCCA	TTCCCTTGTTACAGGTATCCATttttcagctatattaatctttaaa ttaaattcatctgatcaaaacttgacctcagaggaactgttaaaca ggtgtcccctcacttgtctgggctggcactyatgacaacactatc gctgcaattattgtgacccggaagctgcaccatccagccaattatt cacagatttcttgtggctgtcctggtgatgccctcagcattgtgta ggattatgggcaagtggtctgtgacatttggctgagtgttgacat atcttgcatctctcagctatagcttggatcggtatcgagcaatca caggaaaaggactccaaagcatgctggcattatgattacaatagtt tctctatgccttcctctattctggaggcaccaaggaactagcagaga atcttgcatctctcagctatagcttggatcgtatcgagcaatca caggaaaaggactccaaagcatgctggcattatgattacaatagtt tctctatgccttcctctattctggaggcaccaaggaactagcagaga cacgaccacattgtttccaccattactcaacatttGGAGCTTTCT
HTR1EL u2	HTR1E L	T	C	I	T	cds	GE1160	TTCCCTTGTTA CAGGTATCCAT	GTGGGATGTAG AAAGCTCCA	TTCCCTTGTTACAGGTATCCATttttcagctatattaatctttaaa ttaaattcatctgatcaaaacttgacctcagaggaactgttaaaca ggtgtcccctcacttgtctgggctggcactgatgacaacactatc caattatttcttgtggctgtcctggtgatgccctcagcattgtgta gatttcttgtggctgtcctggtgatgccctcagcattgtgtata tatggggcaagtggtctgtgacatttggctgagtgttgacat atcttgcatctctcagctatagcttggatcggtatcgagcaatca caggaaaaggactccaaagcatgctggcattatgattacaatagtt tctctatgccttcctctattctggaggcaccaaggaactagcagaga cacgaccacattgtttccaccattactcaacatttGGAGCTTTCT
HTR1EL u3	HTR1E L	T	G	V	G	cds	GE1160	TTCCCTTGTTA CAGGTATCCAT	GTGGGATGTAG AAAGCTCCA	TTCCCTTGTTACAGGTATCCATttttcagctatattaatctttaaa ttaaattcatctgatcaaaacttgacctcagaggaactgttaaaca ggtgtcccctcacttgtctgggctggcactgatgacaacactatc caattatttcttgtggctgtcctggtgatgccctcagcattgtgta gatttcttgtggctgtcctggtgatgccctcagcattgtgtata tatggggcaagtggtctgtgacatttggctgagtgttgacat atcttgcatctctcagctatagcttggatcggtatcgagcaatca caggaaaaggactccaaagcatgctggcattatgattacaatagtt tctctatgccttcctctattctggaggcaccaaggaactagcagaga cacgaccacattgtttccaccattactcaacatttGGAGCTTTCT

FIG. 5VVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1ELu4	HTR1EL	A	T	E	V	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATtttcagctatattaatcttttaaaacaaagaaaatggatttcttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattctggtgtccctcactctgtctgggctggcactgatgacaacaactatcaactcccttgtgatcgctgcaattattgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagtcacagattttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagctggattatggggcaagtggtctgtgacatttggctgagtgttgacattacctgctgcacgtgctccatcttgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttg[a/t]gtatgccaggaaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgttttatctctatgcctcctctattctggaggcaccaaggaactagcagagatgatgaatgcatcatcaagcacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640
HTR1ELu5	HTR1EL	T	A	I	I	cds	GE1158	CGACCACATTGTTTCCACCA	AGTTATTCCTCCCCTCAAAA	CGACCACATTGTTTCCACCAtttactcaacatttggagctttctacatcccactggcattgatttgatccttactacaaaatatatagagcagcaaagacattataccacaagagacaagcaagtaggattgcaaaggaggaggtgaatggccaagtccttttggagagtggtgagaaaagcactaaatcagtttccacatcctatgtactagaaaagtctttatctgacccatcaacagactttgataaaat[t/a]catagcacagtgagaagtctcaggtctgaattcaagcatgagaaatcttggagaaggcaaaagatctcaggtacaagagaacggaaagcagccactaccctgggattaatcttgggtgcatttgtaatatgttggcttcctttttttgtaaaagaattagttgttaatgtctgtgacaaatgtaaaatttctgaagaaatgtccaatttttggcatggcttgggtatctcaattcccttataaatccactgatttacacaatctttaatgaagacttcaagaaagcattccaaaagcttgtgcgatgtcgatgttagttttaaaaatgtttattattgaaggatgggggttTTTGAGGGGAGGAATAACT	631
HTR1ELu6	HTR1EL	T	G	D	E	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATtttcagctatattaatcttttaaaacaaagaaaatggatttcttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattctggtgtccctcactctgtctgggctggcactgatgacaacaactatcaactcccttgtgatcgctgcaattattgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagtcacagattttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagctggattatggggcaagtggtctgtgacatttggctgagtgttgacattacctgctgcacgtgctccatcttgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttgagtatgccaggaaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgttttatctctatgcctcctctattctggaggcaccaaggaactagcagagatga[t/g]gaatgcatcatcaagcacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640
HTR1Eu1	HTR1E	T	C	I	T	cds	GE1157	CAGCCAAAGGAAAATAACCAA	GCACCCAGCGTGGAGTAAAT	CAGCCAAAGGAAAATAACCAAcagcttctccacagtgtagactgaaacaagggaaacatgaacatcacaaactgtaccacagaggccagcatggctataagacccaagaccatcactgagaagatgctcatttgcatgactctggtggtcatcaccaccctcaccacgttgctgaacttggctgtga[t/c]catggctattggcaccaccaagaagctccaccagcctgccaactacctaatctgttctctggccgtgacggacctcctggtggcagtgctcgtcatgcccctgagcatcatctacattgtcatggatcgctggaagcttgggtacttcctctgtgaggtgtggctgagtgtggacatgacctgctgcacctgctccatcctccacctctgtgtcattgccctggacaggtactgggccatcaccaatgctattgaatacgccaggaagaggacggccaagagggccgcgctgatgatccttaccgtctggaccatctccattttcatctccatgccccctctgttctggagaagccaccgccgcctaagccctcccccctagtcagtgcaccatccagcacgaccatgttatctacaccATTTACTCCACGCTGGGTGC	630

FIG. 5WWWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Eu 2	HTR1E	G	T	E	D	cds	GE1156	GCACGACCATG TTATCTACACC	CCCATCCACTC ATGAGGCT	GCACGACCATGTTATCTACACCatttactccacgctgggtgcgttttatatccccttgactttga tactgattctctattaccggatttaccacgcggccaagagcctttaccagaaaaggggatcaagt cggcacttaagcaacagaagcacagatagccagaattcttttgcaagttgtaaacttacacagac tttctgtgtgtctgacttctccacctcagaccctaccacagagtttgaaaagttccatgcctcca tcaggatcccccccttcgacaatgatctagatcacccaggagaacgtcagcagatctctagcacc agggaacggaaggcagcacgcatcctggggctgattctgggtgcattcattttatcctggctgcc atttttcatcaaaga[g/t]ttgattgtgggtctgagcatctacaccgtgtcctcggaagtggcc gactttctgacgtggctcggttatgtgaattctctgatcaaccctctgctctatacgagttttaa tgaagactttaagctggcttttaaaaagctcattagatgccgagagcatacttagactgtaaaaa gctaaaaggcacgacttttccagAGCCTCATGAGTGGATGGG	628
HTR1Eu 3	HTR1E	C	A	L	I	cds	GE1156	GCACGACCATG TTATCTACACC	CCCATCCACTC ATGAGGCT	GCACGACCATGTTATCTACACCatttactccacgctgggtgcgttttatatccccttgactttga tactgattctctattaccggatttaccacgcggccaagagcctttaccagaaaaggggatcaagt cggcacttaagcaacagaagcacagatagccagaattcttttgcaagttgtaaa[c/a]ttacac agactttctgtgtgtctgacttctccacctcagaccctaccacagagtttgaaaagttccatgcc tccatcaggatcccccccttcgacaatgatctagatcacccaggagaacgtcagcagatctctag caccagggaacggaaggcagcacgcatcctggggctgattctgggtgcattcattttatcctggc tgccatttttcatcaaagagttgattgtgggtctgagcatctacaccgtgtcctcggaagtggcc gactttctgacgtggctcggttatgtgaattctctgatcaaccctctgctctatacgagttttaa tgaagactttaagctggcttttaaaaagctcattagatgccgagagcatacttagactgtaaaaa gctaaaaggcacgacttttccagAGCCTCATGAGTGGATGGG	628
HTR1Eu 4	HTR1E	C	T	H	H	cds	GE1157	CAGCCAAAGGA AAATAACCAA	GCACCCAGCGT GGAGTAAAT	CAGCCAAAGGAAAATAACCAAcagcttctccacagtgtagactgaaacaagggaaacatgaacat cacaaactgtaccacagaggccagcatggctataagacccaagaccatcactgagaagatgctca tttgcatgactctggtggtcatcaccaccctcaccacgttgctgaacttggctgtgatcatggct attggcaccaccaagaagctccaccagcctgccaactacctaatctgttctctggccgtgacgga cctcctggtggcagtgctcgtcatgcccctgagcatcatctacattgtcatggatcgctggaagc ttgggtacttcctctgtgaggtgtggctgagtgtggacatgacctgctgcacctgctccatcctc cacctctgtgtcattgccctggacaggtactgggccatcaccaatgctattgaatacgccaggaa gaggacggccaagagggccgcgctgatgatccttaccgtctggaccatctccatttcatctcca tgcccctctgttctggagaagccaccgccgcctaagccctcccctagtcagtgcaccatccag ca[c/t]gaccatgttatctacaccATTTACTCCACGCTGGGTGC	630
HTR1Eu 5	HTR1E	C	T	S	F	cds	GE1156	GCACGACCATG TTATCTACACC	CCCATCCACTC ATGAGGCT	GCACGACCATGTTATCTACACCatttactccacgctgggtgcgttttatatccccttgactttga tactgattctctattaccggatttaccacgcggccaagagcctttaccagaaaaggggatcaagt cggcacttaagcaacagaagcacagatagccagaattcttttgcaagttgtaaacttacacagac tttctgtgtgtctgacttctccacctcagaccctaccacagagtttgaaaagttccatgcct[c/ t]catcaggatcccccccttcgacaatgatctagatcacccaggagaacgtcagcagatctctag caccagggaacggaaggcagcacgcatcctggggctgattctgggtgcattcattttatcctggc tgccatttttcatcaaagagttgattgtgggtctgagcatctacaccgtgtcctcggaagtggcc gactttctgacgtggctcggttatgtgaattctctgatcaaccctctgctctatacgagttttaa tgaagactttaagctggcttttaaaaagctcattagatgccgagagcatacttagactgtaaaaa gctaaaaggcacgacttttccagAGCCTCATGAGTGGATGGG	628

FIG. 5XXXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Aa 16	HTR2A	C	A	S	Y	cds	GE1176	TGTTTCATTTT CTGTTCAACTC C	TCACACACAGC TCACCTT	TGTTTCATTTTCTGTTCAACTCCaggtatatccatgccaataccagtctttgggctacaggacga ttcgaaggtctttaaggaggggagttgcttactcgccgatgataactttgtcctgatcggctctt ttgtgtcatttttcattcccttaaccatcatggtgatcacctactttctaactatcaagtcactc cagaaagaagctactttgtgtgtaagtgatcttggcacacgggccaaattagcttctttcagctt cctccctcagagttctttgtcttcagaaaagctcttccagcggtcgatccatagggagccagggt cctacacaggcaggaggactatgcagtccatcagcaatgagcaaaaggcatgcaaggtgctgggc atcgtcttcttcctgtttgtggtgatgtggtgccctttcttcatcacaaacatcatggccgtcat ctgcaaagagtcctgcaatgaggatgtcattggggccctgctcaatgtgtttgtttggatcggtt atctctcttcagcagtcaacccactagtctacacactgttcaacaagacctataggtcagccttt tcacggtatattcagtgtcagtacaaggaaaacaaaaaaccattgcagttaattttagtgaacac aataccggctttggcctacaagtctagccaacttcaaatgggacaaaaaaagaattcaaagcaag atgccaagacaacagataatgactgctcaatggttgctctaggaaagcagcatt[c/a]tgaaga ggcttctaaagacaatagcgacggagtgaatgaaAAGGTGAGCTGTGTGTGA	832
HTR2Aa 17	HTR2A	A	G	I	V	cds	GE1272	GGTTGCTCACT GATACCAA	GAGACTCTGAA ATATGTTGCC	GGTTGCTCACTGATACCAAccttctgcctatagggtaccggtggcctctgccgagcaagctttg tgcagtctggatttacctggacgtgctcttctccacggcctccatcatgcacctctgcgccatct cgctggaccgctacgtcgccatccagaatcccatccaccacagccgcttcaactccagaactaag gcatttctgaaaatc[a/g]ttgctgtttggaccatatcagtaggtaagtGGCAACATATTTCAG AGTCTC	266
HTR2Aa 18	HTR2A	C	T	D	D	cds	GE1272	GGTTGCTCACT GATACCAA	GAGACTCTGAA ATATGTTGCC	GGTTGCTCACTGATACCAAccttctgcctatagggtaccggtggcctctgccgagcaagctttg tgcagtctggatttacctggacgtgctcttctccacggcctccatcatgcacctctgcgccatct cgctgga[c/t]cgctacgtcgccatccagaatcccatccaccacagccgcttcaactccagaac taaggcatttctgaaaatcattgctgtttggaccatatcagtaggtaagtGGCAACATATTTCAG AGTCTC	266
HTR2Aa 19	HTR2A	A	C	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctg[a/c]agaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaat agtttatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaa ttccactctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729

FIG. 5YYYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Ad 14	HTR2A	C	T	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgccagacactcacagcactc[c/t]gag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacag ttgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Ad 15	HTR2A	G	A	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtgaaccctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaattttctt tccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagt tgtctgctaatctttacttaagacttttttgttttccttttattagctaagcaacattataggag ctgaaattcctgacagcagctgtggcaattcagcctaagaatggctgagaactgtaacccaaaga tacatccaattactatgggattaacactggatgtatttttaattgactttcttaatgtagaatgt gtacatccccactgtttctgattgcatgctatttaataatactgttgctaaactagtaccatc[g/a]gcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaacttttcttt ctttgtccagaacatttatcttccccgaacgctcaaaaaaaaccctgcaacctctatgctaaaag tttcattctgctttTTTGTCCTCGGTTTGGTGAG	749
HTR2Au 1	HTR2A	G	C	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccaca[g/c]actgcctagccaccctgagcctatgtggccaatgtcagtaa ttccactctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729

FIG. 5ZZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR2Au 10	HTR2A	C	T	A	V	cds	GE1176	TGTTTCATTTTCTGTTC	TCACACAGCTCACCTT	TGTTTCATTTTCTGTTCAACTCCaggtaggtatatccatgccaataccagtctttgggctacaggacga 832 ttcgaaggtctttaaggaggggagttgttgcttactcgccgatgataactttgtcctgatcggctctt ttgtgtcatttttcattccctaaccaaccatcatggtgatcacctacttctactatcaagtcactc cagaaagaagctacttgcatcaggtcgatccatagggagccagggtaagtgatcttggcacacgggccaaattagcttctttttcagctt cctccctcagagttcttgtcttcagacctacacaggcaggaggactatgcagtcagtccatcagcaatgagcaaaaggcatgcaaggtgctgggcatcgtctcttcttcatcacaaacatccatgccgctcaagtcatgtcagtacaagaataccggctttggcctacaagtctagatgtcattgggccctgctcaatgtgtttgttggatcggttctagctcacactgttcaacaagacctataggtcagcctttcaaggaaaacaaaaaaccattgcagttaatttagtgaacacctagccaccttcaaatgggacaaaaaaagaattcaagcaagtgctcaatggttg[c/t]tctaggaaagcagcattctgaagagtgaatgaaAAGGTGAGCTGTGTGTGA	760 attgtgaatgaagaaaacttacagccaccacagttcctcagacaaaaatccagcccccgggagaacagcatgtacacccagccatcaaggtgaatagtgagcagaaaactataacctgttagtcctctggcttagacatggatattcttttgtgaagaaaatacttcctaatgcaattaaatgatgacaccaggctctacagtaatgactgatttctgatttctaactattgctgaaacatactcgtcacttctgatgcatttaaatgctgcaggacatgtccctagaggaaaaaagccgtagtgattatttctaactattgctgaaacatactcgtcaagctgccaccaactatttccctgatgtcacttgccccttgtccatgcccgtgtccatgttaaccatcctgtatggtgattcgCACTGGTAATAAAGAGCA	TGCAACCTCTATGCTAAAAGtttcatttcaccaaacagtggactcctcctaaaattgttaactatcattgtaataatggaagacttcagtgttacagagtgtgggtacatcatcttacacctcatctgctacaagttctgttgagctcaactacgaactccctaatgtaactcc[g/t]gagaagctaacacttaccaacctttcctgtgaagggtgcctcaaactggtcctgctttactgacagccgttcatggcagtgtccctagagaaaaagcatagctgatatgctgctgggtttccttgtggcattagtttccccagctatattCG	749 CCGTGCCAGAGGAAGCCaacaggatccttgaagtcagcaaaacagaaaccaaatttactatcatattatgctggtggaagatcaagaagaggggtgactctacaccagttttacttaagacttaagagatacatccaattactatgggatttatgtacatccccactgtttctgattcggcataaccaacaaaatgagatatcttgtccagaacatttatctttccccgttcattcctgctttTTGTCCTCGGTTGGTTTGGTGAG	TGTTTCATTTTCTGTTCAACTCCaggt ttcgaaggtctttaaggaggggagttg ttgtgtcatttttcattccctaacca cagaaagaagctacttgcatcaggtcgatccatagggagccagggt cctccctcagagttcttgtcttcaga cctacacaggcaggaggactatgcagt atcgtcttcttcctgtttgtggtgatg ctgcaaagagtcctgcaatgaggatgt atcttcttccagcagtcaacccactag tcacggtatatttcagtgtcagtacaag aataccggctttggcctacaagtctag atgccaagacaacagataatgactgct ggcttctaaagacaatagcgacgggagt
HTR2Au 11	HTR2A	G	T	G	*	cds	GE1172	TGCAACCTCTA TGCTAAAAG	TGCTCTTTATT ACCAGTGCG	
HTR2Au 12	HTR2A	C	T	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	

FIG. 5AAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Au 13	HTR2A	A	G	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtgaaccctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaatttctt tccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagt tgtctgctaatctttacttaagacttttttgttttccttttattagctaagcaacattataggag ctgaaattcctgacagcagctgtggcaattcagcctaagaatggctgagaactgtaacccaaaga tacatccaattactatgggattaacactggatgtatttttaattgactttcttaatgtagaatgt gtacatccccactgtttctgattgcatgctattttaataatactgttgctaaactagtaccatcg gcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaacttttcttcttt gtccagaacatttatcttccccga[a/g]cgctcaaaaaaaaccctgcaacctctatgctaaaag tttcattctgctttTTTGTCCTCGGTTTGGTGAG	749
HTR2Au 2	HTR2A	A	G	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgcc[a/g]gacactcacagcactccgag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctacttteccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Au 3	HTR2A	A	G	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtg[a/g]accctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaattt tctttccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggagga aagttgtctgctaatctttacttaagacttttttgttttccttttattagctaagcaacattata ggagctgaaattcctgacagcagctgtggcaattcagcctaagaatggctgagaactgtaaccca aagatacatccaattactatgggattaacactggatgtatttttaattgactttcttaatgtaga atgtgtacatccccactgtttctgattgcatgctattttaataatactgttgctaaactagtacc atcggcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaacttttctt ctttgtccagaacatttatcttccccgaacgctcaaaaaaaaccctgcaacctctatgctaaaag tttcattctgctttTTTGTCCTCGGTTTGGTGAG	749

FIG. 5BBBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR2Au 4	HTR2A	G	C	-	-	noncoding	GE1172	TGCAACCTCTA TGCTAAAAG	TGCTCTTTATT ACCAGTGCG	catctgctttttgtcctcggtttggtgagaaaataataaa 760 attgtgaatgaagaaacttacagccaccacagttcagttct agacaaaaatccagccccgggagaacagcatgtacaccagcc gtacatcaaggtgaatagtgagcagaaactataacctgttag aagttctggcttagacatggatattctttgtgaagaaatac ccctaatgcaattaaatgatgacaccaggctctacagtaatg acttctgatgcatttaactggacagtcgactctgaaaatcga cctctcaccgtcgtgtctcctcttacttcatctccagaaaa ccgtagtgattattctaactattgctggaaacatactcgtca aagctgcagaatgccaccaactatttccctgatgtcacttgcc ccttgtcatgcccgtgtccatgttaaccatcctgtatggtga ttCGCACTGGTAATAAAGAGCA
HTR2Au 5	HTR2A	C	T	S	S	cds	GE1172	TGCAACCTCTA TGCTAAAAG	TGCTCTTTATT ACCAGTGCG	TGCAACCTCTATGCTAAAAGtttcatt 760 accaaacagtggacttcctcctaaaattg ttaactatcattgtaataatggaagac tcagtgttacagagtgtgggtacatca tcttacacctcatctgctacaagttctg ttgagctcaactacgaactccctaatg taactc[c/t]ggagaagctaacactt accaacctttcctgtgaagggtgcctc aaactggtcttgctttactgacagccgt tcatggcagtgtccctagagaaaaagc atagctgatatgctgctgggtttccttt gtggcattagtttcccagctatattCG
HTR2Au 6	HTR2A	C	T	H	Y	cds	GE1176	TGTTTCATTTT CTGTTCAACTC C	TCACACACAGC TCACCTT	TGTTTCATTTTCTGTTCAACTCCaggt 832 ttcgaaggtctttaaggaggggagttg ttgtgtcatttttcattccctaaccca cagaaagaagctacttgtgtgtaagtt cctccctcagagttctttgtctttcaga cctacacaggcaggaggactatgcagt atcgtctcttcttcctgtttgtggtgatg ctgcaaagagtcctgcaatgagaggatgt atctcttcagcagtcaacccactag tcacggtatattcagtgtcagtacaag aataccggctttggccctacaagtctag atgccaagacaacagataatgactgct ggcttctaaagacaatagcgacgggagt

FIG. 5CCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Au 7	HTR2A	A	G	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgaggaca tactgtttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacagtgcc acttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagcaaagg aaaacttccc[a/g]atattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Au 8	HTR2A	A	G	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgaggaca tactgtttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacagtgcc acttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagcaaagg aaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgccctc ctggctgttgctaccttgcagcttatgacatacac[a/g]tagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Au 9	HTR2A	G	A	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtgaaccctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaatttttctt tccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagt tgtctgctaatctttacttaagacttttttgttttcctttattagctaagcaacattataggag ctgaaattcctgacagcagctgtggcaattca[g/a]cctaagaatggctgagaactgtaaccca aagatacatccaattactatgggattaacactggatgtatttttaattgactttcttaatgtaga atgtgtacatccccactgtttctgattgcatgctattttaataatactgttgctaaactagtacc atcggcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaacttttctt ctttgtccagaacatttatcttccccgaacgctcaaaaaaaaccctgcaacctctatgctaaaag tttcattctgctttTTTGTCCTCGGTTTGGTGAG	749
HTR2Cu 1	HTR2C	G	C	C	S	cds	GE1126	TTTTTCAGTGT GCACCTAATTG	ACTTACCATAA AGGATTGCC	TTTTTCAGTGTGCACCTAATTGgcctattggtttggcaat[g/c]tgatatttctgtgagcccag tagcagctatagtaactgacattttcaatacctccgatggtggacgcttcaaattcccagacggg gtacaaaactggccagcactttcaatcgtcatcataataatcatgacaatagqtggcaacatcct tgtgatcatggcagtaagcatggaaaagaaactgcacaatgccaccaattacttcttaatgtccc tagccattgctgatatgctagtgggactacttgtcatgcccctgtctctcctGGCAATCCTTTAT GGTAAGT	332

FIG. 5DDDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Cu 2	HTR2C	A	C	M	L	cds	GE1275	CCTAGATATTT GTGCCCCGT	CGATCAAACGC AAATGT	CCTAGATATTTGTGCCCCGTctggatttctttagatgttttatttttcaacagcgtccatc[a/c] tgcacctctgcgctatatcgctggatcggtatgtagcaatacgtaatcctattgagcatagccgt ttcaattcgcggactaaggccatcatgaagattgctattgtttgggcaatttctataggtaaata aaacttttggccataagaattgcagcggctatgctcaatactttcggattatgtactgtgaaca acgtacagacgtcgactggtaACATTTGCGTTTGATCG	298
HTR2Cu 3	HTR2C	C	G	L	V	cds	GE993	CAAAAGAAAGG ATGATATGATG A	TTACAGGAATG AATGCACCG	CAAAAGAAAGGATGATATGATGAacctagcctgttaatttcgtcttctcaattttaaactttggt tgcttaagactgaagcaatcatggtgaac[c/g]tgaggaatgCGGTGCATTCATTCCTGTAA	128
HTR2Cu 4	HTR2C	C	G	I	M	cds	GE1275	CCTAGATATTT GTGCCCCGT	CGATCAAACGC AAATGT	CCTAGATATTTGTGCCCCGTctggatttctttagatgttttatttttcaacagcgtccatcatgca cctctgcgctatatcgctggatcggtatgtagcaatacgtaatcctattgagcatagccgtttca attcgcggactaaggccat[c/g]atgaagattgctattgtttgggcaatttctataggtaaata aaacttttggccataagaattgcagcggctatgctcaatactttcggattatgtactgtgaaca acgtacagacgtcgactggtaACATTTGCGTTTGATCG	298
HTR5Au 1	HTR5A	T	C	H	H	cds	GE1319	TCTGCAAGTAC CCCAGG	GGATTGCTGAG ATACCCA	TCTGCAAGTACCCCAGGgcggtctcctgacccagagatggatttaccagtgaacctaacctcctt ttccctctccaccccctcccctttggagaccaaccacagcctcggcaaagacgacctgcgcccca gctcgcccctgctctcggtcttcggagtgcttattctcaccttgctgggctttctggtggcggcg acgttcgcctggaacctgctggtgctggcgaccatcctccgtgtacgcaccttccaccgcgtgcc ccacaacctggtggcatccatggccgtctcggatgtcctggtggccgcgctggtcatgccgctga gcctggtgca[t/c]gagctgtccgggcgccgctggcagctaggtcggaggctgtgccagctttg gatcgcgtgcgacgtgctttgctgcacggccagcatctggaacgtgacggccatagccctggacc gctactggtccatcacgcgccacatggaatacacgctccgcacccgcaagtgcgtctccaacgtc atgatcgcgctcacctgggcactctccgctgtcatctctctggccccgctgctttttggctgggg agagacgtactctgagggcagcgaggagtgccaggtaagccgcgagccttcctacgccgtgttct ccaccgtaggcgccttctacctgccgctctgtgtggtgctcttcgtgtactggaagatctacaag gctgccaagttccgcgtgggctccaggaagaccaatagcgtctcacccatatccgaagctgtgga ggTGGGTATCTCAGCAATCC	800
HTR5Au 2	HTR5A	A	T	P	P	cds	GE1319	TCTGCAAGTAC CCCAGG	GGATTGCTGAG ATACCCA	TCTGCAAGTACCCCAGGgcggtctcctgacccagagatggatttacc[a/t]gtgaacctaacct ccttttccctctccaccccctcccctttggagaccaaccacagcctcggcaaagacgacctgcgc ccagctcgcccctgctctcggtcttcggagtgcttattctcaccttgctgggctttctggtggc ggcgacgttcgcctggaacctgctggtgctggcgaccatcctccgtgtacgcaccttccaccgcg tgccccacaacctggtggcatccatggccgtctcggatgtcctggtggccgcgctggtcatgccg ctgagcctggtgcatgagctgtccgggcgccgctggcagctaggtcggaggctgtgccagctttg gatcgcgtgcgacgtgctttgctgcacggccagcatctggaacgtgacggccatagccctggacc gctactggtccatcacgcgccacatggaatacacgctccgcacccgcaagtgcgtctccaacgtc atgatcgcgctcacctgggcactctccgctgtcatctctctggccccgctgctttttggctgggg agagacgtactctgagggcagcgaggagtgccaggtaagccgcgagccttcctacgccgtgttct ccaccgtaggcgccttctacctgccgctctgtgtggtgctcttcgtgtactggaagatctacaag gctgccaagttccgcgtgggctccaggaagaccaatagcgtctcacccatatccgaagctgtgga ggTGGGTATCTCAGCAATCC	800

FIG. 5EEEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR5Au3	HTR5A	C	T	I	I	cds	GE1319	TCTGCAAGTACCCCAGG	GGATTGCTGAGATACCCA	TCTGCAAGTACCCCAGGgcggtctcctgacccagagatggatttaccagtgaacctaacctcctttttccctctccacccccctcccctttggagaccaaccacagcctcggcaaagacgacctgcgcccccagctcgcccctgctctcggtcttcggagtgcttattctcaccttgctgggctttctggtggcggcgacgttcgcctggaacctgctggtgctggcgaccatcctccgtgtacgcaccttccaccgcgtgccccacaacctggtggcatccatggccgtctcggatgtcctggtggccgcgctggtcatgccgctgagcctggtgcatgagctgtccgggcgccgctggcagctaggtcggaggctgtgccagctttggatcgcgtgcgacgtgctttgctgcacggccagcatctggaacgtgacggccatagccctggaccgctactggtccatcacgcgccacatggaatacacgctccgcacccgcaagtgcgtctccaacgtcatgatcgcgctcacctgggcactctccgctgtcat[c/t]tctctggccccgctgcttttggctggggagagacgtactctgagggcagcgaggagtgccaggtaagccgcgagccttcctacgccgtgttctccaccgtaggcgccttctacctgccgctctgtgtggtgctcttcgtgtactggaagatctacaaggctgccaagttccgcgtgggctccaggaagaccaatagcgtctcacccatatccgaagctgtggaggTGGGTATCTCAGCAATCC	800
HTR6d5	HTR6	G	A	P	P	cds	GE1148	CCAGGCCGTGTGCGACT	AGGGTCTGGGTTCTGCTCA	CCAGGCCGTGTGCGACTgcatctccccaggcctcttcgatgtcctcacatggctgggttactgtaacagcaccatgaaccccatcatctacccactcttcatgcgggacttcaagcgggcgctgggcaggttcctgccatgtccacgctgtccccgggagcgccaggccagcctggcctcgccatcactgcgcacctctcacagcggcccccggcccggccttagcctacagcaggtgctgccgctgcccctgccgccggactcagattcggactcagacgcaggctcaggcggctcctcgggcctgcggctcacggcccagctgctgcttcctggcgaggccacccaggaccccccgctgcccaccagggccgctgccgccgtcaatttcttcaacatcgaccccgcggagcccgagctgcggcc[g/a]catccacttggcatccccacgaacctgacccgggcttggggctggccaatggggagctggatTGAGCAGAACCCAGACCCT	511
HTR6u1	HTR6	C	A	Q	K	cds	GE1148	CCAGGCCGTGTGCGACT	AGGGTCTGGGTTCTGCTCA	CCAGGCCGTGTGCGACTgcatctccccaggcctcttcgatgtcctcacatggctgggttactgtaacagcaccatgaaccccatcatctacccactcttcatgcgggacttcaagcgggcgctgggcaggttcctgccatgtccacgctgtccccgggagcgccaggccagcctggcctcgccatcactgcgcacctctcacagcggcccccggcccggccttagccta[c/a]agcaggtgctgccgctgcccctgccgccggactcagattcggactcagacgcaggctcaggcggctcctcgggcctgcggctcacggcccagctgctgcttcctggcgaggccacccaggaccccccgctgcccaccagggccgctgccgccgtcaatttcttcaacatcgaccccgcggagcccgagctgcggccgcatccacttggcatccccacgaacctgacccgggcttggggctggccaatggggagctggatTGAGCAGAACCCAGACCCT	511
HTR6u2	HTR6	G	T	A	A	cds	GE1316	GTTCTCACGGACGGTCCCC	CTCCGAGGCCTGACTGG	GTTCTCACGGACGGTCCCCgtccagcctgcgcttcgccggggccctcatctgctttcccgccaccctatcactcccttgccgtccaccctcggtcctcatggtcccagagccgggcccaaccgccaatagcaccccggcctgggggcagggccgccgtcggccccgggggcagcggctgggtggcggccgcgctgtgcgtggtcatcgcgctgacggcggc[g/t]gccaactcgctgctgatcgcgctcatctgcactcagcccgcgctgcgcaacacgtccaacttcttcctggtgtcgctcttcacgtctgacctgatggtggggctggtggtgatgccgccggccatgctgaacgcgctgtacgggcgctgggtgctggcgcgcggcctctgcctgctctggaccgccttcgacgtgatgtgctgcagcgcctccatcctcaacctctgcctcatcagcctggaccgctacctgctcatcctctcgccgctgcgctacaagctgcgcatgacgccccctgcgtgccctggccctagtcctgggcgcctggagcctcgccgctctcgcctcctttcctgcccctgctgctgggctggcacgagctgggccacgcacggccacccgtccctggccagtgccgcctgctggccagcctgccttttgtccttgtggcgtcgggcctcaccttcttcctgccctcgggtgccatatgcttcacctactgcaggatcctgctagctgcccgcaagcaggccgtgcaggtggcctccctcaccaccggcatggCCAGTCAGGCCTCGGAG	807

FIG. 5FFFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
HTR6u3	HTR6	C	A	P	T	cds	GE1148	CCAGGCCGTGT GCGACT	AGGGTCTGGT TCTGCTCA	511 caggccttcttcgatgtcctcacatggctgggttactgta ccactttcatgcgggacttcaagcgggcgctgggcagg ggagcgccaggccagcctggcctgccatcactgcgcac ttagcctacagcaggtgctg[c/a]cgctgcccctgccg aggctcaggcggctcctcgggcctgcggctcacggccca aggacccccgctgcccaccagggccgctgccgccgtca cccgagctgcggccgcatccacttggcatcccacgaac gggagctggatTGAGCAGAACCCAGACCCT	511 caggccttcttcgatgtcctcacatggctgggttactgta ccactttcatgcgggacttcaagcgggcgctgggcagg ggagcgccaggccagcctggcctgccatcactgcgcac ttagcctacagcaggtgctgccctgccccgccgctgg tcaggcggctcctcgggcctgcggctcacggcccagctg ccccccgctgcccaccagggccgctgccgc[c/t]gtca cccgagctgcgggccgcatccacttggcatccccacgaac gggagctggatTGAGCAGAACCCAGACCCT
HTR6u4	HTR6	C	T	A	A	cds	GE1148	CCAGGCCGTGT GCGACT	AGGGTCTGGGT TCTGCTCA	839 ggtgttcatcctgttatctttccatcctccactaggtac ccctgtgaggcagaatgggaaatgcatgggcgaagatgat ccatcaccttacctcccactcttggatgggctcagaatg agccaggacttggctactaccgatttactctaccgcagtg gctttcatgtactaccagatttacaaggctgccaggaa gcttccctcgagtggagccagacagcgtcatcgccctga gtggaagagtgtgcaaacctttcgagactcctcaagcat gcgagaacagaaagcagccaccaccctgggatcatcgt catttttcctcctctcgacagccagaccctcatctgtg tgggtggagaggacatttctgtggctaggctatgcaaac ctctcttcaaccgggacctgaggaccacctatcgcagcct accggaagctctcagctgcaggcatgcatgaagccctga acctgagtttgTGCTGTAAGGTCATTTATCACT	839 TTGCTTGGTTGACCAGTTATGatcacggtg cttgggatcacaaggcccctcacatacctct tctctccgtctggcttctcctccgcctccat taaatgatgataaggtgtgcttgatcagcc gcatttatatcccccatgtccgtcatgctt gagtgctgccaaacacaagtttcctggctt atggcatagtgaagctccagaagaggagtgg gaaaggaaaacatctccatcttaagcga cgggccttaccgtgtgctggctgccatt gcacttcctgcagctgcatcccactgtggg tctcttcattaccctttatatatgcctc gctccagtgccagtaccggaatatcaaccg agc[t/c]tgctgagaggccagagacct	839 TTGCTTGGTTGACCAGTTATGatcacggtg cttgggatcacaaggcccctcacatacctct tctctccgtctggcttctcctccgcctccat taaatgatgataaggtgtgcttgatcagcc gcatttatatcccccatgtccgtcatgctt gagtgctgccaaacacaagtttcctggctt atggcatagtgaagctccagaagaggagtgg gaaaggaaaacatctccatcttaagcga cgggccttaccgtgtgctggctgccatt gcacttcctgcagctgcatcccactgtggg tctcttcattaccctttatatatgcctc gctccagtgccagtaccggaatatcaaccg agc[t/c]tgctgagaggccagagacct
HTR7d1	HTR7	T	C	L	P	cds	GE1178	TTGCTTGGTTG ACCAGTTATG	AGTGATAAATG ACCTTACAGCA	972 GGCTTAATAAAATAGCATTAGGTctatcta gtagtgtactgttccaccaaattgtgaatttt gttagaaggctccattgtttgttggctct gtcttctgaacttgatcaagagcatggag gaagatttaaagataagtaagttccttaa cagcaagtggagaaaataagaacaaagaga tgccaaantcccccntggggaatccttggc ccagacatcttcaaagagcagtagctcttcat gaaagtatttccttatgagatggggttat aaagagatggctaacaatcctgtgaagattt cttatacagtcttttatgaatttcttaatg tatcagaatgaggaataagttaaagctataatca tgtatgtttgacttgttgaagctataatca aagattgtgctaatttattagagcagaaccc tcaaatcacatggctttccaccaatatttt
HTR6u3	HTR6	C	A	P	T	noncoding	GE1192	GGCTTAATAAA ATAGCATTAGG T	GATGCCATTGC ATAAATCAGA	972 GGCTTAATAAAATAGCATTAGGTctatcta gtagtgtactgttccaccaaattgtgaatttt gttagaaggctccattgtttgttggctct gtcttctgaacttgatcaagagcatggag gaagatttaaagataagtaagttccttaa cagcaagtggagaaaataagaacaaagaga tgccaaantcccccntggggaatccttggc ccagacatcttcaaagagcagtagctcttcat gaaagtatttccttatgagatggggttat aaagagatggctaacaatcctgtgaagattt cttatacagtcttttatgaatttcttaatg tatcagaatgaggaataagttaaagctataatca tgtatgtttgacttgttgaagctataatca aagattgtgctaatttattagagcagaaccc tcaaatcacatggctttccaccaatatttt
IGF1d35	IGF1	A	G	-	-					

FIG. 5GGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1d36	IGF1	C	T	C	C	cds	GE591	GAAAGCAGATTGCACCCTAAC	CCACCCAGGTGGGCTTA	GAAAGCAGATTGCACCCTAACatgaggccactctgtttgatttgtgcagacaagcccacagggtatggctccagcagtcggagggcgcctcagacaggcatcgtggatgagtg[c/t]tgcttccggagctgtgatctaaggaggctggagatgtattgcgcacccctcaagcctgccaagtcagctcgctctgtccgtgcccagcgccacaccgacatgcccaagacccagaaggTAAGCCCACCTGGGTGG	253
IGF1d37	IGF1	C	T	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactctttgttag[c/t]actcactgactcttctatgcagttactacatatctagtaaaaccttgtttaatactataaataatattctattcattttgaaaaacacaatgattccttctttttctaggcaatataaggaaagtgatccaaaatttgaaatattaaaataatatctaataaaaagtcacaaagttatcttcttttaacaaactttacttcttattcttagctgtatatacatttttttaaaaagtttgttaaaatatgctgactagagtttcagttgaaaggcaaaaacttccatcacaacaagaaatttcccatgcctgctcagaagggtagcccctagctctctgtgaatgtgttttatccattcaactgaaaattggtatcaagaaagtccactggttagtgtactagtccatcatagcctagaaaatgatccctatctgcagatcaagatttttctcATTAGAACAATGAATTATCCAGC	807
IGF1u1	IGF1	C	A	A	D	cds	GE638	GGAACCACTTGTTCTCAATGC	TTTCCGTTTTCTCCATGTTTC	GGAACCACTTGTTCTCAATGCaattatttttgtgatgtttacagtatcagcccccatctaccaacaagaacacgaagtctcagagaaggaaaggttggccaaagacacatccaggaggggaacagaaggaggggacagaagcaagtctgcagatcagaggaaagaagaaagagcagaggagggagattggaagtagaaatg[c/a]tgaatgcagaggcaaaaaaggaaaatgaaggacaggaggattaaacagacagaggcaaggatgatgagagaggagcagacagcaagaatgaaaagcagaaaatacaatagaggaaatgaagaaaagtaggcctgctggagctagatgatgatgtgatggaaatagaagtaacctttagagaatctcgctaaGAAACATGGAGAAAACGGAAA	419
IGF1u10	IGF1	A	G	-	-	noncoding	GE688	TCATAGCCTAGAAAATGATCCCTAT	AGGGTTTGCATCAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagattttctcattagaacaatgaattatccagcattcagatctttctagtcaccttagaacttttggttaaaagtacccaggcttgattatttcatgcaaattctatattttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagtttttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaaagactccctggatctctgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtatttaactctcagtccaacattatttgaattgagcacctcaagcatgcttagcaatgttctaatcactatggacagatgtaaaagaaactatacatcatttttgccctctgcctgttttccagacatacaggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtccccagtgtgtaccttttaaaattattccctctcaacaaaactttataggcagtcttctgcagacttaac[a/g]tgttttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcactaattctatccacagtcaaaaatccccccaaggaggaaagctgaaagatgcaactgccaatattatctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataactcattataccaattcactatttttatttttaatgaattaaaactagaAAACAAATTGATGCAAACCCT	847

FIG. 5HHHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
IGF1ul 1	IGF1	T	G	-	-	noncoding	GE682	CCAACACATA ATCCTCTCCAAC T	CACATTGGCAT AGCTGGC	CCAACACATAATCCTCTCCAACTggattataaataaattg tatttttatttttaatgaattaaactagaaaacaaattg [t/g]actatatactacagcagaatgactccagatttcata ccaaaacttacaagctttgcttcagaattagattgcttt agatatttgtaaaagaacagtaaacattggtaagaatgag atttaattgaccatactggatacttaggtcaaattctgt gtattatttgaacttttaagatgaggcagttcccctgaa atccactcttctagggatatgaaaatctcttaacacccac acacacacacacacacacacacacacacacattcacctaag tcacttccttgaaatttttattaaaaaacaaacaaacaaa tccttcctcctccttggaacgtcaatgtttgtgtagatgaa ggtttctgttactatttttatgcacttgggagaaggcttag ttcccatttatttgtttgGCCAGCTATGCCAATGTG
IGF1ul 2	IGF1	T	C	-	-	noncoding	GE683	TTTTATATTAC TGAGGCCTAAA AGT	AGATATACCAT TTTATTATGAC ACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattt aaagtaggaaaaataaaaacagagctctaaaaatcccctttc aactcatagcaaagtcacttctgttaatcccttaatctga ccgctgctaaacacactgcaggagggactcctgaaacctca gtgtctgtgtatcatgaaaatgtctattcaaaatatcaaa attcagtttacataaaggccccaaataccatgtcagatct tgagaattgggattacatcatgtatttgcctcatgtatt t/cjgataaataaacttacagacactgaattaatttcccc gactggccattcgttacatctgtcttagttgaaaagcata tatttgaaattattattcaattcacttatggcagaggaat gtaactaattgaatcattatctttacatttactgtttaata GAGTGTCATAATAAAATGGTATATCT
IGF1ul 3	IGF1	G	A	G	E	cds	GE642	AAAAATGCTTC TGTGCTCTAGT	GAATTCCCCAA TGACTTCAA	AAAAATGCTTCTGTGCTCTAGTtttaaaatgcaaaggtat aaagtccttacttcaataacttgccagaagagggagagagg gtttcctgtcctacagtgtctgtgtttgtagataaaatgtg gtttgctaaatctcactgtcactgctaaattcagagcaga tcctcaaaattgaaatgtgacattgctccaacatctccc attattcctgctaaccaattcattttcagacttgtacttt gcagtcttccaacccaattatttaagtgctgctttgtga tctTTGAAGTCATTGGGGAATTC

FIG. 5IIIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u14	IGF1	T	G	-	-	noncoding	GE688	TCATAGCCTAGAAAATGATCCCTAT	AGGGTTTGCATCAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagattttctcattagaacaatgaattatccagcattcagatctttctagtcaccttagaacttttggttaaaagtacccaggcttgattatttcatgcaaa[t/g]tctatattttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagttttttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaaagactccctggatctctgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtattttaactctcagtccaacattatttgaattgagcacctcaagcatgcttagcaatgttctaatcactatggacagatgtaaaagaaactatacatcatttttgccctctgcctgttttccagacatacaggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtcccagtgtgtaccttttaaaattattccctctcaacaaaactttataggcagtcttctgcagacttaacatgttttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcacttaattctatccacagtcaaaaatccccaaggaggaaagctgaaagatgcaactgccaatattatctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataactcattataccaattcactatttttatttttaatgaattaaaactagaAAACAAATTGATGCAAACCCT	847
IGF1u15	IGF1	T	G	-	-	noncoding	GE688	TCATAGCCTAGAAAATGATCCCTAT	AGGGTTTGCATCAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagattttctcattagaacaatgaattatccagcattcagatctttctagtcaccttagaacttttggttaaaagtacccaggcttgattatttcatgcaaattctatattttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagtttttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaaaagactccctggatctctgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtatttaactctcagtccaacattatttgaattgagcacctcaagca[t/g]gcttagcaatgttctaatcactatggacagatgtaaaagaaactatacatcatttttgccctctgcctgttttccagacatacaggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtcccagtgtgtaccttttaaaattattccctctcaacaaaactttataggcagtcttctgcagacttaacatgttttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcacttaattctatccacagtcaaaaatccccaaggaggaaagctgaaagatgcaactgccaatattatctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataactcattataccaattcactatttttatttttaatgaattaaaactagaAAACAAATTGATGCAAACCCT	847
IGF1u16	IGF1	T	C	-	-	noncoding	GE688	TCATAGCCTAGAAAATGATCCCTAT	AGGGTTTGCATCAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagattttctcattagaacaatgaattatccagcattcagatctttctagtcaccttagaacttttggttaaaagtacccaggcttgattatttcatgcaaattctatattttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagtttttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaaaagactccctggatctctgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtatttaactctcagtccaacattatttgaattgagcacctcaagcatgcttagcaatgttctaatcactatggacagatgtaaaagaaactatacatcatttttgccctctgcctgttttccagacatacaggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtcccca g[t/c]gtgtaccttttaaaattattccctctcaacaaaactttataggcagtcttctgcagacttaacatgttttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcacttaattctatccacagtcaaaaatccccaaggaggaaagctgaaagatgcaactgccaatattatctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataactcattataccaattcactatttttatttttaatgaattaaaactagaAAACAAATTGATGCAAACCCT	847

FIG. 5JJJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u17	IGF1	A	T	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccaccttcaacttttatcactcacaagtagtgtactgttcaccaaattgtgaatttgggggtgcaggggcaggagttggaaatttttaaagttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatattatccaatcttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaagaatttaaaagataagtaagttccttattgatttttgtgcactctgctctaaaacagatattcagcaagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgccaaantccccctntgggaatccttggcaatttactggtttatagaagacattctcccttcacccagacatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaagtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaagagatggctaacaatctgtgaagatttttgtttcttggttttgttttttttttttttttacttt[a/t]tacagtctttatgaatttcttaatgttcaaaatgacttggttcttttcttctttttttatatcagaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaatgtatgtttgacttgttgaagctataatcagactatttaaaatgttttgctatttttaatcttaaaagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccattcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u18	IGF1	G	A	-	-	noncoding	GE683	TTTTATATTACTGAGGCCTAAAAGT	AGATATACCATTTTATTATGACACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttatttttgcccaaaatgcactgatgtaaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcaccaactcatagcaaagtcacttctgttaatcccttaatctgattttgtttggatatttatcttgtaccccgctgctaaacacactgcaggagggactctgaaacctcaa[g/a]ctgtctacttacatctttatctgtgtctgtgtatcatgaaaatgtctattcaaaatatcaaaacctttcaaatatcacgcagcttatattcagtttacataaaggccccaaataccatgtcagatctttttggtaaaagagttaatgaactatgagaattgggattacatcatgtattttgcctcatgtatttttatcacacttataggccaagtgtgataaataaacttacagacactgaattaatttcccctgctactttgaaaccagaaaataatgactggccattcgttacatctgtcttagttgaaaagcatatttttttattaaattaattctgattgtatttgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaaatgtaactaattgaatcattatcttacatttactgtttaataagcatattttgaaaatgtatggctAGAGTGTCATAATAAAATGGTATATCT	741
IGF1u19	IGF1	C	G	-	-	noncoding	GE1191	TTTATAGGAAGTACATTTGAAGAAC	ACAAACTACAAAATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgtaggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagttacctgttaaacttttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttccccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaaatggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaaagaaaaaaaaatatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgtatagatccagttgcactaaatt[c/g]ctctctgaatcttggctgctggagccattcattcagcaaccttgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgttttgttttacagtgtctgataatcttgttagtctatacccaccacctcccttcataacctttatatttgccgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaagattccatctgtggcatttgtaccaaatataagttggatgcattttattttagacacaaagcttttattttccacatcatgcttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcattttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatgagttaatgtgcaacctaattagtaactttcctcttttttatttttttccatatagagcactatgtaaattttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttttagtataATGGTGCTATTTTGTAGTTTGT	993

FIG. 5KKKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
IGF1u20	IGF1	G	A	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	807 AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataccattcatagctagaga ttggtgaattgaatgctccctgacatcctcagttcttgtccagtgaccatgaaatccaaatactggccaa ctagttgttaaaa[g/a]cttaacagcttcaatcctcttaaaacttatgaatacaaagataagtgaaa tttgattttcaatttgattttgaattctgcatttggtttaaaacacaatgatcctaaaaaaaaaaaaa gagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactt ctttgttagcactcactgactcttctatgcagttactacatttctcttctttttctaggcaatatagga tataaatatattcttattcatttgaaaaacacaatgatccaaaatttgaaatattaaatatatctaataa aagtgatccaaaatttactcttatcctgtatatacatttttttaaaagtttcagttgtaaaggcaaaaacttccatcacaaca acaaactttacttatcctagctctcctgtgaatgtgttttatccattcaggtagccctagctcctgtttagtgtactagtccatcatagcctagaaaatg agggtagccccctagctcctctgtgaatgtgttttatccattcaggtagccctagctcctgtttagtgtactagtccatcatagcctagaaaatg tccactggttagtgtactagtccatcatagcctagaaaatg ttccATTAGAACAATGAATTATCCAGC
IGF1u20	IGF1	T	G	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	807 AGGGCGCTTGAGTTGCTgagatgcaggaattctataaataccattcatagctagaga ttggtgaattgaatgctccctgacatcctcagttcttgtccagtgaccatgaaatccaaatactggccaa ctagttgttaaaa[g/a]cttaacagcttcaatcctcttaaaacttatgaatacaaagataagtgaaa tttgattttcaatttgattttgaattctgcatttggtttaaaacacaatgatcctaaaaaaaaaaaaa gagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactt ctttgttagcactcactgactcttctatgcagttactacatttctcttctttttctaggcaatatagga tataaatatattcttattcatttgaaaaacacaatgatccaaaatttgaaatattaaatatatctaataa aagtgatccaaaatttactcttatcctgtatatacatttttttaaaagtttcagttgtaaaggcaaaaacttccatcacaaca acaaactttacttatcctagctctcctgtgaatgtgttttatccattcaggtagccctagctcctgtttagtgtactagtccatcatagcctagaaaatg agggtagccccctagctcctctgtgaatgtgttttatccattcaggtagccctagctcctgtttagtgtactagtccatcatagcctagaaaatg tccactggttagtgtactagtccatcatagcctagaaaatg ttccATTAGAACAATGAATTATCCAGC
IGF1u21	IGF1	T	C	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATTGTAAGTAA	796 AGATAAGACAGAGGCCCAGGgggatttttgaagctgtctttaattctgcccccatcccaacccagcc cttattatttagtatcctgccttcagaatttcacgtgttccctcttaatgaggctgaccaagctgaaaacatatattcacgtgttccctcttaatagaggct aaggaacctcactgaaaacatatattcacgtgttccctcttaatagaggct gggtctcgcactgtcccccaggctggagtgcagtggcatgatcgatctcggctcactgcaacctcccacc tcctgggtt[t/c]aagcgattctcctgcctcagcctcctgagtagctgggattacaggcaccca ccactatgcccggctaatttttggatttttaatagagacggggtttcaccatattggccaggctggtct ggactcaaactcctgaccttgtgatttgcccgcctcagcctcccaaagtgctgggattacaggcgt tgagccaccacacccctgcccatgttccctcttaatgtatcttaaagtaaaaaaaaaaagaggacacaaaaccaaatgggctcttttcctcctcattcttcaactatctttgatggggtcttt tttaaagtaaaaaaaaaaaagagttctcctaataaccggagctgaatttaagatggagacagagttctcctaataaccggagctgaa accttccacaatccttagaatctgccttttttatttactctcATTTTATTTTGCCCAA

FIG. 5LLLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u22	IGF1	T	A	-	-	noncoding	GE1191	TTTATAGGAAG TACATTTGAAG AAC	ACAAACTACAA AATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgt aggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagtt acctgttaaactttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttc ccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaa atggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaaagaaaaaa aaatatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgt atagatccagttgcactaaattcctctctgaatcttggctgctggagccattcattcagcaacct tgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgtttgt ttacagtgtctgataatcttgttagtctatacccaccacctcccttcataacctttatatttgc cgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaaga ttccatctgtggcatttgtaccaaa[t/a]ataagttggatgcattttatttagacacaaagct ttatttttccacatcatgcttacaaaaaagaataatgcaaatagttgcaactttgaggccaatca ttttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatga gttaatgtgcaacctaattagtaactttcctctttttatttttttccatatagagcactatgtaaa tttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttttagtataATGG TGCTATTTTGTAGTTTGT	993
IGF1u23	IGF1	T	C	-	-	noncoding	GE1191	TTTATAGGAAG TACATTTGAAG AAC	ACAAACTACAA AATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgt aggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagtt acctgttaaactttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttc ccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaa atggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaaagaaaaaa aaatatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgt atagatccagttgcactaaattcctctctgaatcttggctgctggagccattcattcagcaacct tgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgtttgt ttacagtgtctgataatcttgttagtctatacccaccacctcccttcataacctttatatttgc cgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaaga ttccatctgtggcatttgtaccaaatataagttggatgcattttatttagacacaaagctttat ttttccacatcatgcttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcatttt taggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatga[t/c]ga gttaatgtgcaacctaattagtaactttcctctttttatttttttccatatagagcactatgtaaa tttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttttagtataATGG TGCTATTTTGTAGTTTGT	993
IGF1u24	IGF1	T	G	-	-	noncoding	GE683	TTTTATATTAC TGAGGCCTAAA AGT	AGATATACCAT TTTATTATGAC ACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttatttttgcccaaaatgcactgatgt aaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcacc aactcatagcaaagtcacttctgttaatcccttaatctgattttgtttggatatttatcttgtac ccgctgctaaacacactgcaggagggactctgaaacctcaagctgtctacttacatcttttatct gtgtctgtgtatcatgaaaatgtctattcaaaatatcaaaacctttcaaatatcacgcagcttat attcagtttacataaaggccccaaataccatgtcagatctttttggtaaaagagttaatgaacta tgagaattgggattacatcatgtattttgcctcatgtatttttatcacacttataggccaagtgt gataaataaacttacagacactgaattaatttcccctgctactttgaaaccagaaaataatgact ggccattcgttacatctgtcttagttgaaaagcatatttttattaaattaattctgattgtatt tgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaaatgtaa ctaattgaatcatta[t/g]cttacatttactgtttaataagcatattttgaaaatgtatggctA GAGTGTCATAATAAAATGGTATATCT	741

FIG. 5MMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u2 5	IGF1	T	C	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaa gtagtgtactgttcaccaaattgtgaatttggggtgcaggggcaggagttggaaatttttaaa gttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatattatccaatc ttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaag aatttaaaagataagtaagttccttattgattttgtgcactctgctctaaaacagatattcagc aagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgcc aaantcccccntggggaatccttggcaatttactggtttatagaagacattctcccttcacccag acatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaa gtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaag agatggctaacaatctgtgaagatttttgtttcttggttttgtttttttttttttttttacttt atacagtctttatgaatttcttaatgttcaaaatgacttggttcttttcttcttttttttatatc agaatgaggaataataagttaaacccacatagactctttaaaacta[t/c]aggctagatagaaa tgtatgtttgacttgttgaagctataatcagactatttaaaatgttttgctattttttaatcttaa aagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccat tcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u2 6	IGF1	G	A	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATAAAATGAGTAATGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcc cttattatttagtatctgcctcagaatttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctcttttttttcctttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttggatttttaatagagacggggtttaccatgttggccaggttggac tcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggcatgag ccaccacaccctgcccatgtgttccctcttaatgtat[g/a]attacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u2 7	IGF1	T	G	-	-	noncoding	GE682	CCAACACATAATCCTCTCCAACT	CACATTGGCATAGCTGGC	CCAACACATAATCCTCTCCAACTggattataaataaattgaaaataactcattataccaattcac tattttatttttttaatgaattaaaactagaaaacaaattgatgcaaaccctggaagtcagttgat tactatatactacagcagaatgactcagatttcatagaaaggagcaaccaaaatgtcacaaccaa aactttacaagctttgcttcagaattagattgctttataattcttgaatgaggcaatttcaagat atttgtaaaagaacagtaaacattggtaagaatgagctttcaactcataggcttatttccaattt aattgaccatactggatacttaggtcaaatttctgttctctcttgcccaaataatattaaagtat ta[t/g]ttgaacttttaagatgaggcagttcccctgaaaagttaatgcagctctccatcaga atccactcttctagggatatgaaaatctcttaacacccaccctacatacacagacacacacacac acacacacacacacacacacacacacattcaccctaaggatccaatggaatactgaaaagaaa tcacttccttgaaaatttattaaaaaacaaacaaacaaacaaaaagcctgtccacccttgagaa tccttcctctccttggaacgtcaatgtttgtgtagatgaaaccatctcatgctctgtggctccag ggtttctgttactatttatgcacttgggagaaggcttagaataaaagatgtagcacattttgct ttcccatttattgtttgGCCAGCTATGCCAATGTG	815

FIG. 5NNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u28	IGF1	T	G	-	-	noncoding	GE1192	GGCTTAATAAA ATAGCATTAGG T	GATGCCATTGC ATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaa gtagtgtactgttcaccaaattgtgaatttgggggtgcaggggcaggagttggaaatttttaaa gttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatat[t/g]atcc aatcttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaata gaagaatttaaaagataagtaagttccttattgatttttgtgcactctgctctaaaacagatatt cagcaagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttc tgccaaantccccctggggaatccttggcaatttactggtttatagaagacattctcccttcac ccagacatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttg gaaagtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttg aaagagatggctaacaatctgtgaagatttttgtttcttggttttgttttttttttttttttta ctttatacagtctttatgaatttcttaatgttcaaaatgacttggttctttttcttctttttta tatcagaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaa tgtatgtttgacttgttgaagctataatcagactatttaaaatgttttgctatttttaatcttaa aagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccat tcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u29	IGF1	G	C	-	-	noncoding	GE1192	GGCTTAATAAA ATAGCATTAGG T	GATGCCATTGC ATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaa gtagtgtactgttcaccaaattgtgaatttgggggtgcaggggcaggagttggaaatttttaaa gttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatattatccaatc ttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaag aatttaaaagataagtaagttccttattgatttttgtgcactctgctctaaaacagatattcagc aagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgcc aaantccccctggggaatccttggcaatttactggtttatagaagacattctcccttcacccag acatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaa gtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaag agatggctaacaatctgtgaagatttttgtttcttggttttgttttttttttttttttacttt atacagtctttatgaatttcttaatgttcaaaatgacttggttctttttcttctttttttatatc agaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaat[g/ c]tatgtttgacttgttgaagctataatcagactatttaaaatgttttgctatttttaatcttaa aagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccat tcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u3	IGF1	T	C	-	-	noncoding	GE1326	GCTTTATTTTT CCACATCATGC	CCTAGAAAAGA AGGAATCATTG	GCTTTATTTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaa tcatttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatga tgagttaatgtgcaacctaattagtaactttcctctttttattttttccatatagagcactatgt aaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgttttttagtataa tggtgctattttgtagtttgttatatgaaagagtctggccaaaacggtaatacgtgaaagcaaaa caataggggaagcctggagccaaagatgacacaaggggaagggtactgaaaacaccatccatttg ggaaagaaggcaaagtccccccagttatgccttccaagaggaacttcagacacaaaagtccactg atgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggctaggaat tttagcagtcctggtttcttttctcatggaagaaatgaacatctgccagctgtgtcatggactc accactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgcaaaat gggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagattcag attttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgcaagg aattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctc agttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatc tcttaaaacacttttcaaaatatgtgggaagcatttgatttcaatttgattttgaattctgcat ttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaa	1196

FIG. 500000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
IGF1u30	IGF1	G	T	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGgattttttgaagctgtctttattctgccccatcccaacccagcc796 cttattatttagtatcctgcctcagaaagaatttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttatttcacgtgttcccctctctttttttttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttggatttttagagacggggtttaccatgttggccaggttggtctcaaa ctcaaactcctgaccttgtgatttgcccttcaccacacccctgcccatgtgttcctttaaaaaaa ccttctcctcattcttcaactatctttgattttaaagtaaaaaaaaaaaaaaaaaaaaagagagg tttaaagtaaaaaaaaaaaaaaaaaaaaagagagtttctcctaattaagatggagacagagtttcc ttaagatggagacagagtttcctcttaaaaaaaaaaaaaaaaaaaaagagtttctcctaattaag acttccacaatccttagaatcctgcctcagcctcccaaagtgctgggattacaggcgtgagccac ATTTTATTTTGCCCAA
IGF1u31	IGF1	A	T	-	-	noncoding	GE1191	TTTATAGGAAG TACATTTGAAG AAC	ACAAACTACAA AATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgctttatatttccttttcctgtttcctgtttcctttcctt993 aggaagacccctcctgaggagtgaaggtgtgtgtgtgtgtgtgtgtgtgtgtgtgtgtgtgtgt acctgttaaacttttggaacacctaccatttttttttttttttttttttttttttttttttttt ccccaatgaaatacacaagtaaacattttttttttttttttttttttttttttttttttttttt atggtcctggagttggtagattgctgtttttttttttttttttttttttttttttttttttttt aaatatatatatatatatatatcttgtttttttttttttttttttttttttttttttttttttt atagatccagttgcactaaattcctctttttttttttttttttttttttttttttttttttttt tgtctaagtggtttatgaattgtttccttttttttttttttttttttttttttttttttttttt ttacagtgtctgataatcttgttagtttttttttttttttttttttttttttttttttttttt cgaatttggcctcctcaaaagcagcagtttttttttttttttttttttttttttttttttttt ttccatctgtggcatttgtaccaaatatttttttttttttttttttttttttttttttttttt tttccacatcatgcttacaaaaaagatttttttttttttttttttttttttttttttttttt taggcatatgttttaaacatagaaagtttttttttttttttttttttttttttttttttttt atgtgcaacctaattagtaacttcctttttttttttttttttttttttttttttttttttt a/tlgcatatcaattatatacaggatatttttttttttttttttttttttttttttttttt TGCTATTTTGTAGTTTGT
IGF1u32	IGF1	G	T	-	-	noncoding	GE1326	GCTTTATTTTT CCACATCATGC	CCTAGAAAAGA AGGAATCATTG	GCTTTATTTTTCCACATCATGCttacatttttaggcatatgttttaaacattttttttttttt1196 tcatttttaggcatatgttttaaacatttttttttttttttttttttttttttttttttttt tgagttaatgtgcaacctaattagtaatttttttttttttttttttttttttttttttttttt aaatttagcatatcaattatacaggatttttttttttttttttttttttttttttttttttt tggtgctatttgtagtttgttatatgttttttttttttttttttttttttttttttttttt caatagggaagcctggagccaaagatttttttttttttttttttttttttttttttttttt ggaaagaaggcaaagtcccccccagttaattttttttttttttttttttttttttttttttt atgcaaattggactggcgagtccagatttttttttttttttttttttttttttttttttttt gaatttagcagtccctggtttctttttttttttttttttttttttttttttttttttttttt actcaccactgtgtgaccttgggcaagatttttttttttttttttttttttttttttttttt aaatggggcaatatgtcatcctacctatttttttttttttttttttttttttttttttttt tcagatttttttaccctgggttgcttgttttttttttttttttttttttttttttttttt aaggaattcttataaataacccattcatttttttttttttttttttttttttttttttttt tctcagttcttgtcagtgaagctatccatttttttttttttttttttttttttttttttttt aatctcttaaaaacactttcaaaatatttttttttttttttttttttttttttttttttttt gcatttggtttatgaatacaaagatatttttttttttttttttttttttttttttttttttt

FIG. 5PPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u33	IGF1	T	A	-	-	noncoding	GE1326	GCTTTATTTTT CCACATCATGC	CCTAGAAAAGA AGGAATCATTG	GCTTTATTTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaa tcatttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatga tgagttaatgtgcaacctaattagtaactttcctcttttttatttttttccatatagagcactatgt aaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgttttttagtataa tggtgctattttgtagtttgttatatgaaagagtctggccaaaacggtaatacgtgaaagcaaaa caataggggaagcctggagccaaagatgacacaaggggaagggtactgaaaacaccatccatttg ggaaagaaggcaaagtccccccagttatgccttccaagaggaacttcagacacaaaagtccactg atgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggctaggaat tttagcagtcctggtttctttttctcatggaagaaatgaaca[t/a]ctgccagctgtgtcatgg actcaccactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgca aaatgggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagat tcagatttttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgc aaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgaca tctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctc aatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattct gcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaa	1196
IGF1u34	IGF1	T	G	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGggatttttgaagctgtctttattctgcccccatcccaacccagcc cttattattttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctctttttttttccttttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttttggatttttaatagagacggggttttaccatgttggccaggttggac tcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggcatgag ccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgatcctt ctctcctcattcttcaactatctttgatggggtc[t/g]ttcaaggggaaaaaaatccaagcttt ttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgccttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u4	IGF1	T	G	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGggatttttgaagctgtctttattctgcccccatcccaacccagcc cttattattttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatata[t/g]ttcacgtgttccctctctttttttttccttttttgtga gatggggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctc cacctcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcaccca ccactatgcccggctaatttttttggatttttaatagagacggggttttaccatgttggccaggtt ggactcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggca tgagccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt ttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgccttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796

FIG. 5QQQQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u5	IGF1	A	T	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGggatttttgaagctgtctttattctgcccccatcccaacccagcc cttattattttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctctttttttttccttttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttttggatttttaatagagacggggttttaccatgttggccaggttgg[a /t]ctcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggca tgagccaccacacccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgccttttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u6	IGF1	T	G	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGggatttttgaagctgtctttattctgcccccatcccaacccagcc cttattattttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctctttttttttccttttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttttggatttttaatagagacggggttttaccatgttggccaggttggac tcaaactcctgaccttgtgatttgcccgcctcagcctcccaaa[t/g]tgctgggattacaggca tgagccaccacacccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgccttttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u7	IGF1	C	T	-	-	noncoding	GE683	TTTTATATTAC TGAGGCCTAAA AGT	AGATATACCAT TTTATTATGAC ACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttatttttgcccaaaatgcactgatgt aaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcacc aactcatagcaaagtcacttctgttaatcccttaatctgattttgtttggatatttatcttgtac ccgctgctaaacacactgcaggagggactctgaaacctcaagctgtctacttacatcttttatct gtgtctgtgtatcatgaaaatgtctattcaaaatatcaaaacctttcaaatatcacgcagcttat attcagtttacataaaggccccaaataccatgtcagatctttttggtaaaagagttaatgaacta tgagaattgggattacatcatgtattttgcctcatgtatttttatcacacttataggccaagtgt gataaataaacttacagacactgaattaatttcccctgctactttgaaaccagaaaataatgact ggccatt[c/t]gttacatctgtcttagttgaaaagcatatttttttattaaattaattctgattg tatttgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaaat gtaactaattgaatcattatcttacatttactgtttaataagcatattttgaaaatgtatggctA GAGTGTCATAATAAAATGGTATATCT	741

FIG. 5RRRRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u8	IGF1	T	A	-	-	noncoding	GE1326	GCTTTATTTTT CCACATCATGC	CCTAGAAAAGA AGGAATCATTG	GCTTTATTTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaa tcatttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatga tgagttaatgtgcaacctaattagtaactttcctcttttttatttttccatatagagcactatgt aaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgttttttagtataa tggtgctattttgtagtttgtta[t/a]atgaaagagtctggccaaaacggtaatacgtgaaagc aaaacaataggggaagcctggagccaaagatgacacaaggggaagggtactgaaaacaccatcca tttgggaaagaaggcaaagtccccccagttatgccttccaagaggaacttcagacacaaaagtcc actgatgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggctag gaattttagcagtcctggtttctttttctcatggaagaaatgaacatctgccagctgtgtcatgg actcaccactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgca aaatgggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagat tcagatttttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgc aaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgaca tctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctc aatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattct gcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaa	1196
IGF1u9	IGF1	A	T	-	-	noncoding	GE678	AGGGCGCTTGA GTTGCT	GCTGGATAATT CATTGTTCTAA T	AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataacccattcatagcatagctagaga ttggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaa ctagttgttaaaagctaacagctcaatctcttaaaacacttttcaaaatatgtgggaagcatttg attttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagaga aaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactctt gttagcactcactgactcttctatgcagttactacatatctagtaaaaccttgtttaatactata aataatattctattcattttgaaaaacacaatgattccttctttttctaggcaatataaggaaagt gatccaaaatttgaaatattaaaataatatctaataaaaagtcacaaagttatcttctttaacaa actttactcttattcttagctgtatatacatttttttt[a/t]aaaagtttgttaaaatatgcttg actagagtttcagttgaaaggcaaaaacttccatcacaacaagaaatttcccatgcctgctcaga agggtagcccctagctctctgtgaatgtgttttatccattcaactgaaaattggtatcaagaaag tccactggttagtgtactagtccatcatagcctagaaaatgatccctatctgcagatcaagattt tctcATTAGAACAATGAATTATCCAGC	807
IGF2a2	IGF2	C	T	-	-	noncoding	GE689	GGAAGAGCGTG GAGAGCA	CCAATTGTTTC TCAGCCAAT	GGAAGAGCGTGGAGAGCAggcacctgctgaccagccccttcccctcccaggacaacttccccaga taccccgtgggcaagttcttccaatatgacacctggaagcagtccacccagcgcctgcgcagggg cctgcctgccctcctgcgtgcccgccggggtcacgtgctcgccaaggagctcgaggcgttcaggg aggccaaacgtcaccgtcccctgattgctctacccacccaagaccccgcccacgggggcgccccc ccagagatggccagcaatcggaagtgagcaaaactgccgcaagtctgcagcccgg[c/t]gccac catcctgcagcctcctcctgaccacggacgtttccatcaggttccatcccgaaaatctctcggtt ccacgtcccctggggcttctcctgacccagtccccgtgccccgcctccccgaaacaggctactct cctcggccccctccatcgggctgaggaagcacagcagcatcttcaaacatgtacaaaatcgattg gctttaaacaccttcacataccctcccccaaattatccccaattatccccacacataaaaaat caaaacattaaactaacccccttcccccccccccacaacaaccctcttaaaactaattggcttt tagaaacaccccacaaaagctcagaaattggctttaaaaaaaacaaccaccaaaaaaaatcaatt ggctaaaaaaaaaaagtattaaaaacgaATTGGCTGAGAAACAATTGG	763

FIG. 5SSSSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF2u1	IGF2	A	G	-	-	noncoding	GE689	GGAAGAGCGTG GAGAGCA	CCAATTGTTTC TCAGCCAAT	GGAAGAGCGTGGAGAGCAggcacctgctgaccagccccttcccctcccaggacaacttccccaga taccccgtgggcaagttcttccaatatgacacctggaagcagtccacccagcgcctgcgcagggg cctgcctgccctcctgcgtgcccgccggggtcacgtgctcgccaaggagctcgaggcgttcaggg aggccaaacgtcaccgtcccctgattgctctacccacccaagaccccgcccacgggggcgccccc ccagagatggccagcaatcggaagtgagcaaaactgccgcaagtctgcagcccggcgccaccatc ctgcagcctcctcctgaccacggacgtttccatcaggttccatcccgaaaatctctcggttccac gtcccctggggcttctcctgacccagtccccgtgccccgcctcccgaaacaggctactctcctc ggcccccctcc[a/g]tcgggctgaggaagcacagcagcatcttcaaacatgtacaaaatcgattg gctttaaacacccttcacataccctcccccccaaattatcccccaattatccccacacataaaaaat caaaacattaaactaacccccttcccccccccccacaacaaccctcttaaaactaattggctttt tagaaacaccccacaaaagctcagaaattggctttaaaaaaaacaaccaccaaaaaaaatcaatt ggctaaaaaaaaaaagtattaaaaacgaATTGGCTGAGAAACAATTGG	763
KLK2d1	KLK2	T	A	-	-	noncoding	GE478	GGGCCAAAGAA CCAGGTG	CCAGAATTAGG GTCTTCACTCA	GGGCCAAAGAACCAGGTGgggtccggccacagcccag[t/a]ttttctctgacccatagtcttgc gccccaggagtcttcagtgtgtgagcctccatctcctgtccaatgacatgtgtgctagagcttac tctgagaaggtgacagagttcatgttgtgtgctgggctctggacaggtggtaaagacacttgtgg ggtgagtcatccctactcccaacatctggaggggaaaggTGAGTGAAGACCCTAATTCTGG	256
KLK2d2	KLK2	A	G	-	-	noncoding	GE478	GGGCCAAAGAA CCAGGTG	CCAGAATTAGG GTCTTCACTCA	GGGCCAAAGAACCAGGTGgggtccggccacagcccagttttctctgaccc[a/g]tagtcttgc gccccaggagtcttcagtgtgtgagcctccatctcctgtccaatgacatgtgtgctagagcttac tctgagaaggtgacagagttcatgttgtgtgctgggctctggacaggtggtaaagacacttgtgg ggtgagtcatccctactcccaacatctggaggggaaaggTGAGTGAAGACCCTAATTCTGG	256
KLK2d3	KLK2	G	C	V	L	cds	GE484	CCCTCCCCTAT CCAATTCTTT	GCTGTTATTCC TGTGGGACAC	CCCTCCCCTATCCAATTCTTTtgggtctgatccccctgacccagcacccccctccgcaggtgcc[g /c]tgcccctcatccagtctcggattgtgggaggctgggagtgtgagaagcattcccaaccctgg caggtggctgtgtacagtcatggatgggcacactgtgggggtgtcctggtgcacccccagtgggt gctcacagctgcccattgcctaaagaagtaagtaggaccctgggatctggggagggaatggctGT GTCCCACAGGAATAACAGC	279
LIPCd25	LIPC	C	T	-	-	noncoding	GE253	CACACTGGACC GCAAAAGG	AGTGTGTGAGT TATTAGGCATG G	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcc[c/t]gctgc tgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcctgggtg cacacgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggt aaCCATGCCTAATAACTCACACACT	220
LIPCd26	LIPC	C	A	T	T	cds	GE335	CACTTCAATAA GCTCCACCTAA A	TCAGTTTATGA GAGTGAAACAT ACCC	CACTTCAATAAGCTCCACCTAAAacttaaggctgtgtttgcttcctgttttctattcagaatgac attttgttcagaaaacacagatgacctactacttcgcccaacc[c/a]caggaaaaaatcttcgtg aaatgtgaaataaagtctaaaacatcaaagcgaaagatcagatgagatttaatgaagacccagtg taaagaataaatgaatcttactccttatctggaatggctgccttatttagaagccaaaattacat aaagaatctcacacaaagcttaaataaagtttagatttaagggGGGTATGTTTCACTCTCATAAA CTGA	329
LIPCd27	LIPC	C	T	-	-	noncoding	GE335	CACTTCAATAA GCTCCACCTAA A	TCAGTTTATGA GAGTGAAACAT ACCC	CACTTCAATAAGCTCCACCTAAAacttaaggctgtgtttgcttcctgttttctattcagaatgac attttgttcagaaaacacagatgacctactacttcgcccaacccaggaaaaaatcttcgtgaaat gtgaaataaagtctaaaacatcaaagcgaaagatcagatgagatttaatgaagacccagtgtaaa gaataaatgaatcttactccttatctggaatggctgc[c/t]ttatttagaagccaaaattacat aaagaatctcacacaaagcttaaataaagtttagatttaagggGGGTATGTTTCACTCTCATAAA CTGA	329

FIG. 5TTTTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCd28	LIPC	G	A	-	-	noncoding	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgc[g/a]gggagaaagggaaactaaggcgaccctccctctgtcc cctcctcaggtggacggcgtgctagaaaactggatctggcagatggtggccgcgctgaagtctca gccggcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacacca tcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggta ccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCd29	LIPC	C	T	-	-	noncoding	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgta ttcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgggaaa acagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagggccg cgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggtgact gctgattcaatctcctattaa[c/t]gtccatTAAGCACCCACTTGTGCCA	311
LIPCu1	LIPC	G	A	V	M	cds	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcggggagaaagggaaactaaggcgaccctccctctgtcccctc ctcaggtggacggc[g/a]tgctagaaaactggatctggcagatggtggccgcgctgaagtctca gccggcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacacca tcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggta ccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCu10	LIPC	A	T	Q	L	cds	GE374	TGAGAACCAAG TGATCCTCTGA	ATCCTGCATCC TGCCCTTC	TGAGAACCAAGTGATCCTCTGAgttgaggctgctttggcgtaaggggtgataacgtccttcttgc cctgtgttccagccatcacccagaccataaaatgctcccacgagcgatcggtgcacctttttcatc gactccttgctgcacgccggcacgc[a/t]gagcatggcctacccgtgtggtgacatgaacagct tcagccagggcctgtgcctgagctgcaagaagggccgctgcaacacgctgggctaccacgtccgc caggagccgcggagcaagagcaagaggctcttcctcgtaacgcgagcccagtccccccttcaaagg tgagtgtggagctggggagccttcaGAAGGGCAGGATGCAGGAT	369
LIPCu11	LIPC	T	A	N	K	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaa[t/a]aaaa cgtattcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgg gaaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagg gccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggt gactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu12	LIPC	G	A	S	N	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgta ttcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgggaaa acagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatgga[g/a]cacagg gccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggt gactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu13	LIPC	G	A	P	P	cds	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcggggagaaagggaaactaaggcgaccctccctctgtcccctc ctcaggtggacggcgtgctagaaaactggatctggcagatggtggccgcgctgaagtctcagcc[g/a]gcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacacca tcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggta ccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCu14	LIPC	T	G	I	M	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaat[t/g]gctagtaataaaa cgtattcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgg gaaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagg gccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggt gactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311

FIG. 5UUUUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCu15	LIPC	G	C	G	A	cds	GE323	CTCCCGCGTAA CCCTTACC	CGGCCCATGAC TTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcc gaagtgcccccagcaatcgtctttctccaa acccgggagcacatgggcctgagcgtggg caacgggggctcctccagcctg[g/c]c cacggcttcaatggtGAGAATGAAGTCAT	295
LIPCu16	LIPC	A	T	M	L	cds	GE374	TGAGAACCAAG TGATCCTCTGA	ATCCTGCATCC TGCCCTTC	TGAGAACCAAGTGATCCTCTGAgttgagg cctgttccagccatcacccagaccata gactccttgctgcacgccggcacgcagag tcagccagggcctgtgcctgagctgcaag caggagccgcggagcaagagcaagaggct tgagtgtggagctgggggagccttcaGAAG	369
LIPCu17	LIPC	G	A	E	K	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTtgtgta ttccttcttatcacgctggatgtggata]aaaacagtgcagtgtgggccaatgtctg gccgcgccactcaggcctcgttctgaaga gactgctgattcaatctccctattaacgtc	311
LIPCu18	LIPC	G	T	A	S	cds	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcgggagg ctcaggtggacggcgctgctagaaaactgg gcccagccagtgaacgtgggggctggtgga cgtccgcaacacccgccttgtgggcaagg ccgacctgccccagtcctttccttcacctc	320
LIPCu19	LIPC	C	A	-	-	noncoding	GE323	CTCCCGCGTAA CCCTTACC	CGGCCCATGAC TTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttc gagggaagtgccccccagcaatcgtctttc ctttacccgggagcacatgggcctagcg gcccagccag[t/a]gaacgtgggcctgg tcgccgtccgcaacacccgccttgtggc ccgacctgccccagtcctttccttcacctc	295
LIPCu20	LIPC	T	A	V	E	cds	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcgggggag ctcaggtggacggcgctgctagaaaactgg gcccagccag[t/a]gaacgtgggcctgg tcgccgtccgcaacacccgccttgtgggc ccgacctgccccagtcctttccttcacctc	320
LIPCu21	LIPC	A	T	I	F	cds	GE300	TGGGCAGTCTT CCCTAACAA	ACCCCTGGATT CTTTGTGAC	TGGGCAGTCTTCCCTAACAAagtatcttaa agaaagcctggacccccgggtgaaacggag tggtttatgcatctttt[a/t]tccaatc cctgactttcttcccagagatgggcatgaa GGGT	264
LIPCu22	LIPC	C	C	H	P	cds	GE253	CACACTGGACC GCAAAAGG	AGTGTGTGAGT TATTAGGCATG G	CACACTGGACCGCAAAAGGctttcatcca ttccaggaatcttgttcaactctctcgaag a/c]cgtgtcaggatttgccggcagttcc aaCCATGCCTAATAACTCACACACT	220

FIG. 5VVVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCu22	LIPC	T	A	M	K	cds	GE353	AGCAGCCTTTGAGAAGACG	TCACCAGCTCCCTATCTTTTTAT	AGCAGCCTTTGAGAAGACGgagggcttcagatgaagcagatgccaggctaagcaccgtccccaatcttatattgcagagccatttggaagaagagctcaagctgttgaaacaaacaaaacgctgcatgagg[a/t]gaagaccagattcctgctctttggagaaaccaatcagggctgtcagattcgaatcaatcatccggacacgttacaggagtgcggcttcaactcctccctgcctctggtgatgataatccacgggtggtcggtaggaaatgctgacatgccgtttttctctccgatttcactagcgtgttcatgttcATAAAAGATAGGGAGCTGGTGA	345
LIPCu23	LIPC	G	C	G	A	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcccgctgctgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcctgggtgcacacgtgtcaggatttgccg[g/c]cagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCu24	LIPC	A	T	Q	L	cds	GE475	AACTGATTGTGTCTGATTTTCT	TGGCACAAGTGGGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgtattccttttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgggaaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagggccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagc[a/t]aaggtgactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu3	LIPC	T	G	V	V	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcccgctgctgtcttccaggaatctgt[t/g]caactctctcgaagccatgttcacctaattgggtacagcctgggtgcacacgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCu4	LIPC	T	A	L	Q	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcccgctgctgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcc[t/a]gggtgcacacgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCu5	LIPC	A	G	G	G	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcggg[a/g]cctttgtttgagggaagtgccccccagcaatcgtctttctccagatgatgccaattttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu6	LIPC	A	G	N	S	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgccccccagcaatcgtctttctccagatgatgcca[a/g]ttttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu7	LIPC	T	G	N	K	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgccccccagcaatcgtctttctccagatgatgccaa[t/g]tttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu8	LIPC	C	G	T	T	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgccccccagcaatcgtctttctccagatgatgccaatttttgtggatgccattcatacctttac[c/g]cgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295

FIG. 5WWWWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCu9	LIPC	G	T	G	C	cds	GE323	CTCCCGCGTAA CCCTTACC	CGGCCCATGAC TTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagg gaagtgcccccagcaatcgtctttctccagatgatgccaattttgtggatgccattcatacctttt acccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcc caacgggggctccttccagcct[g/t]gctgccacttcctagagctctacagacatattgcccag cacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
MAOAu1	MAOA	G	T	R	R	cds	GE1028	AGTGCAAATAC GTAATTAATGC	AGCAGCCTACC CTTCTTC	AGTGCAAATACGTAATTAATGCgatccctccgaccttgactgccaagattcacttcagaccagag cttccagcagagagaaaccagttaattcagcg[g/t]cttccaatgggagctgtcattaagtgca tgatgtattacaaggaggccttctggaaGAAGAAGGGTAGGCTGCT	176
MAOAu2	MAOA	A	C	R	R	cds	GE984	GGGGAAAACAT ATCCATTT	ATTTACCTCCT TCCCCAT	GGGGAAAACATATCCATTTcggggcgccttttccaccagtatggaatcccattgcatatttggatt acaataatctgtgg[a/c]ggacaatagataacATGGGGAAGGAGGTAAAT	116
MAOBu1	MAOB	T	G	V	V	cds	GE1010	AAAACAGAACC AAAAGGTTAAA	TGATCTTACCT TTACATGGTGG A	AAAACAGAACCAAAAGGTTAAAtatgtggaccttggaggatcctatgt[t/g]ggaccaacccag aatcgtatcttgagattagccaaggagctaggattggagacctacaaagtgaatgaggttgagcg tctgaTCCACCATGTAAAGGTAAGATCA	158
MAOBu2	MAOB	C	T	T	T	cds	GE1010	AAAACAGAACC AAAAGGTTAAA	TGATCTTACCT TTACATGGTGG A	AAAACAGAACCAAAAGGTTAAAtatgtggaccttggaggatcctatgttggaccaacccagaatc gtatcttgagattagccaaggagctaggattggagac[c/t]tacaaagtgaatgaggttgagcg tctgaTCCACCATGTAAAGGTAAGATCA	158
MAOBu3	MAOB	C	T	P	P	cds	GE1068	TGAACCTAGGA TGTCCCTG	CCCAAACTCAT ATCCCAAATAC A	TGAACCTAGGATGTCCCTGcacagcccatcaccaccacctttttggagagacatttgcc[c/t]t ccgtgccaggcctgctcaggctgattggattgaccaccatcttttcagcaacggctcttggcttc ctggcccacaaaaggggctacttgtgagagtctaaagagagagggtgtctgtaatcacactctc ttcttacTGTATTTGGGATATGAGTTTGGG	225
MAOBu4	MAOB	A	G	K	K	cds	GE964	TTTAGATTTAT CCTGGCCCAC	TGTACCTTTCC TCTTTGGTAA	TTTAGATTTATCCTGGCCCACaaagccagaaa[a/g]ctggcacgtcTTACCAAAGAGGAAAGGT ACA	68
MAOBu5	MAOB	A	G	E	E	cds	GE985	ATCTTGCAGCC AGTGCAT	TCTACCTTCCA TATTGAGTCAG G	ATCTTGCAGCCAGTGCATtatgaaga[a/g]aagaactggtgtgaggagcagtactctgggggct gctacacaacttatttccccccctgggatCCTGACTCAATATGGAAGGTAGA	116
MPLd14	MPL	G	A	-	-	noncoding	GE485	CTGTACAGTCC AGCCCCTCC	GGTAGGGAAGT TCACAGAGAAG TC	CTGTACAGTCCAGCCCCTCCtcccacaggatctgctttaatccagc[g/a]cctctcctcatctc tcccagcccaaggccacagtctcagatacctgtgaagaagtggaacccagcctccttgaaatcct ccccaagtcctcagagaggactcctttgcccctgtgttcctcccaggcccagatggactaccgaa gattgcagccttcttgcctggggaccatgcccctgtctgtgtgcccacccatggctgagtcaggg tcctgctgtaccacccacattgccaaccattcctacctaccactaagctattggcagcagccttg aggacaggctcctcactcccagttccctggacagagctaaactctcgaGACTTCTCTGTGAACTT CCCTACC	397
MPLd15	MPL	G	A	P	P	cds	GE929	CTGGTCCCCTC CCCTTC	CTGGAGTGGGA CTCAGC	CTGGTCCCCTCCCCTTCcacataaacatgcctgggaggacccagggccaactcaccagctgttcc ttagatgtctccttgctggcatcagactcagagcccctgaagtgtttctcccgaacatttgagga cctcacttgcttctgggatgaggaagaggcagcgcccagtgggacataccagctgctgtatgcct accc[g/a]cggtaggtgctggactgtgccccactccccatgtatctgtccctgcacttaGCTGA GTCCCACTCCAG	272
MPLd16	MPL	G	A	V	M	cds	GE917	AGAAGTTGGGC ATGGGC	GATTCCGGGAG CTGGAC	AGAAGTTGGGCATGGGCccaggtctgggtcctcaggcgtccgcatggtggctgtgtaggagggac ctcttctatgccaacagggagaagccccgtgcttgccccctgagttcccagagcatgccccactt tggaacccgatacgtgtgccagtttccagaccaggaggaagtgcgtctcttctttccgctgcacc tctgggtgaagaat[g/a]tgttcctaaaccagactcggactcagcgagtcctctttgtggacag tgtaggtaagagccatcctcctgtcaccctgccccctccacttgctgcccccaGTCCAGCTCCCG GAATC	330

FIG. 5XXXXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
MPLu1	MPL	C	T	A	V	cds	GE929	CTGGTCCCCTC CCCTTC	CTGGAGTGGGA CTCAGC	CTGGTCCCCTCCCCTTCcacataaacatgcctgggaggacccagggccaactcaccagctgttcc ttagatgtctccttgctggcatcagactcagagcccctgaagtgtttctcccgaacatttgagga cctcacttgcttctgggatgaggaagaggcag[c/t]gcccagtgggacataccagctgctgtat gcctacccgcggtaggtgctggactgtgccccactccccatgtatctgtccctgcacttaGCTGA GTCCCACTCCAG	272
MPLu10	MPL	A	G	T	A	cds	GE491	AGAGGCTGAGC CATAGACTGT	TGGGGCAAGAT TGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgc cggctcccccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgg gaggagccagctccagaaatcagtgatttcctgaggtacgaactccgctatggccccagagatcc caagaactcc[a/g]ctggtcccacggtcatacagctgattgccacagaaacctgctgccctgct ctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctg gcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctc ttatctcCTACCTTCAATCTTGCCCCA	417
MPLu11	MPL	A	T	D	V	cds	GE490	GGGTTGGAGGC TCTCTCAG	CAGGCTTCCCT AGAGATATTCT TTTA	GGGTTGGAGGCTCTCTCAGctgacaggcagacctagattgtgaagctgggattttcctcccaagg cttcagctctgacagcagagggtggaagctgcctcatctcaggactccagcctggcaactcctac tggctgcagctgcgcagcgaacctg[a/t]tgggatctccctcggtggctcctggggatcctggt ccctccctgtgactgtggacctgcctggagatgcaggtgagtcaacaaaggaatagggagatggg gaggagaTAAAAGAATATCTCTAGGGAAGCCTG	293
MPLu12	MPL	C	A	A	A	cds	GE482	CTCTGGTGGCA CAATGCCT	CCAGGGATCCC CTGCGTA	CTCTGGTGGCACAATGCCTtgtgcacagaaggacttaagctgctccctgctgacatccctgtagt gcgcctccccaccccaaacttgcactggagggagatctccagtgggcatctggaattggagtggc agcacccatcgtcctgggcagc[c/a]caagagacctgttatcaactccgatacacaggagaagg ccatcaggactggaaggtatggtcaagcaacaaatgcccacagacctcacTACGCAGGGGATCCC TGG	263
MPLu13	MPL	T	A	L	Q	cds	GE450	CTCCCTGCCAA TCCACTG	AAGGATCCAGT ACCAGGCAG	CTCCCTGCCAATCCACTGccatggctcagtctgcttctcttccttctcccccaggagactgaggc atgccctgtggccctcacttccagacctgcaccgggtcc[t/a]aggccagtaccttagggacac tgcagccctgagcccggtgagtgtgcttccctcccctgtgcccaccaccaaccCTGCCTGGTACT GGATCCTT	203
MPLu2	MPL	C	A	P	Q	cds	GE491	AGAGGCTGAGC CATAGACTGT	TGGGGCAAGAT TGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgc cggctcccccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgg gaggagc[c/a]agctccagaaatcagtgatttcctgaggtacgaactccgctatggccccagag atcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgct ctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctg gcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctc ttatctcCTACCTTCAATCTTGCCCCA	417
MPLu3	MPL	T	A	L	H	cds	GE491	AGAGGCTGAGC CATAGACTGT	TGGGGCAAGAT TGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgc cggctcccccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgg gaggagccagctccagaaatcagtgatttcctgaggtacgaac[t/a]ccgctatggccccagag atcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgct ctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctg gcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctc ttatctcCTACCTTCAATCTTGCCCCA	417

FIG. 5YYYYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
MPLu4	MPL	C	G	L	V	cds	GE482	CTCTGGTGGCA CAATGCCT	CCAGGGATCCC CTGCGTA	CTCTGGTGGCACAATGCCTtgtgcacagaaggacttaagctgctccctgctgacatccctgtagt gcgcctccccaccccaaacttgcactggagggagatctccagtgggcat[c/g]tggaattggag tggcagcacccatcgtcctgggcagcccaagagacctgttatcaactccgatacacaggagaagg ccatcaggactggaaggtatggtcaagcaacaaatgcccacagacctcacTACGCAGGGGATCCC TGG	263
MPLu5	MPL	G	A	E	K	cds	GE491	AGAGGCTGAGC CATAGACTGT	TGGGGCAAGAT TGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgc cggctcccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgg gaggagccagctccagaaatcagtgatttcctgaggtac[g/a]aactccgctatggccccagag atcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgct ctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctg gcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctc ttatctcCTACCTTCAATCTTGCCCCA	417
MPLu6	MPL	C	A	R	R	cds	GE490	GGGTTGGAGGC TCTCTCAG	CAGGCTTCCCT AGAGATATTCT TTTA	GGGTTGGAGGCTCTCTCAGctgacaggcagacctagattgtgaagctgggatttttcctcccaagg cttcagctctgacagcagagggtggaagctgcctcatctcaggactccagcctggcaactcctac tggctgcagctgcg[c/a]agcgaacctgatgggatctccctcggtggctcctggggatcctggt ccctccctgtgactgtggacctgcctggagatgcaggtgagtcaacaaaggaatagggagatggg gaggagaTAAAAGAATATCTCTAGGGAAGCCTG	293
MPLu7	MPL	T	C	F	S	cds	GE472	ACGTGGGGCTG TATCTGACA	CAGGGCTCCCT CTTCCTG	ACGTGGGGCTGTATCTGACAggaacctgaggggctggcctgggaggggattggggcccagcttcc tgaagggaggatgggctaaggcaggcacacagtggcggagaagatgccctcctgggccctct[t/ c]catggtcacctcctgcctcctcctggcccctcaaaacctggcccaagtcagcagccaaggtga ggtgcacagagggtggagatcacctatgcccCAGGAAGAGGGAGCCCTG	244
MPLu8	MPL	C	T	S	S	cds	GE472	ACGTGGGGCTG TATCTGACA	CAGGGCTCCCT CTTCCTG	ACGTGGGGCTGTATCTGACAggaacctgaggggctggcctgggaggggattggggcccagcttcc tgaagggaggatgggctaaggcaggcacacagtggcggagaagatgccctcctgggccctcttca tggtcacctc[c/t]tgcctcctcctggcccctcaaaacctggcccaagtcagcagccaaggtga ggtgcacagagggtggagatcacctatgcccCAGGAAGAGGGAGCCCTG	244
MPLu9	MPL	G	A	G	G	cds	GE491	AGAGGCTGAGC CATAGACTGT	TGGGGCAAGAT TGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgc cggctcccccagtatcatcaaggccatgggtgg[g/a]agccagccaggggaacttcagatcag ctgggaggagccagctccagaaatcagtgatttcctgaggtacgaactccgctatggccccagag atcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgct ctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctg gcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctc ttatctcCTACCTTCAATCTTGCCCCA	417

FIG. 5ZZZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
NGFBd9	NGFB	G	A	A	A	cds	GE1185	CACATCCATAC TGCCTGAGT	AGGGGCCCAGG AGAGTG	1001 cccgggttacgccctgttgtcccggtataaccattgctagca ccggtttgaatgaaacctcttcgtgatcccccttggaggtca tttgactgcatttagtactccatgaagtcaccctcattc aatgtccatgttgttctacactctgatcacagctttttctga cactcagagagcaatgtccctgcaggacaccacccatcccca ttccctgacactgccctgcagagcccgcagcgcccggg cggggcagacccgcaacattactgtggaccccaggctgttt cgtgtgctgtttagcacccagcctccccgtgaagctgcaga cggtggtgctgccccccttcaacaggacttcacagcagcaagc acagggcgaattctcggtgtgtgacagtgtcagcgtgtgg gacatcaaggcaaggaggtgatggtgttgggagaggtgaa gtacttttgagaccaagtgccgggacccaaatcccgttg caaagcactggaactcatattgtaccacgactcacacctt aagcaggctgccttggcggtttatccggatagatacggcctg tgtgagaagagcctgacctgccgacacgctccctcccccctg Ce	1002 CACATCCATACTGCCTGAGTcagccccg caccctttccctcttcagaagtgccccgg actctgagggacccagaaactgccttt ttttcattccagggtgcatagcgtaatg tcggcatacaggc[g/a]gaaccacact agtccactggactaaacttcagcattcc cagcggcgatagctgcacgcgtggcggg aaaaagcggcgactccgttcaccccgtg cactcaggatcctggacttcgaggtcggt ggtcatcatcccatcccatcttccacag gttgggataagaccaccgccacagaca cattaacaacagtgtattcaaacagtac acagcgggtgccgggcattgactcaa gtcaaggcgctgaccatggatggcaagc tgtgtgtgctccagcaggaaggctgtg ccccttctaCACTCTCCTGGGCCCCe	TTTACAGAGGAGCTGACGTTTGCtacac gagaggcccctccaggagcagaactaatt g[g/c]taactgcagtgcagtatggagt tagtcacatagaagaacaaacaataaaag gaaaagaaggaaggtggatggaaggac tggttcagttttcatttgtgacttcagt ttatatgtgaaataaatatgataaatcc acacatttaaaaacatcacacaaagag gcgtctgaagaggtgcctggactaagat ttgtgaattcataacaagggctccaag aaggggtaccagttctgaggcttcaag ggattcaaaactgttgagcaggacggca aaactctcccccaccaacctccctggtac gcttcagagaactcaaaggactctgtaa attcagggctcttgtcacttcctggag agtcagccccGGGTTACGCCTGTTGTC	noncoding

FIG. 5AAAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
NGFBu2	NGFB	A	G	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	1002 TTTACAGAGGAGCTGACGTTTGctacactcctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaactaattccacaattacttgaccaagttgggggattatttgtgg ggtaactgcagtgcagtatggagtccgtaagaacaaacaatagaggacacactagcttagtaagggtc cacataagaacaaacaatagaggacacactagcttagtaagggtcaactttgaattcctaattgaactc agaaggaagggtggatggaaggacacactagcttagtaagggtcaactttgaattcctaattgaactc tcagttttcatttgtgacttcagtgcctagtgtgctttagtgttagttcatttctgtgaatcagtttcc atgtgaaataaatatgataaatcctaatgctgcttagtgttagttcatttctgtgaatcagtttcc atttaaaaacatcacacaaagaggatgctgcttagtgttagttcatttctgtgaatcagtttcc ctgaagaggtgcctggactaagatggatgctgcttagtgttagttcatttctgtgaatcagtttcc tgaattcataacaagggctccaagtgctgcttagtgttagttcatttctgtgaatcagtttcc atttcagggctcctgtcacttcctgggcaaaatgctgcttagtgttagttcatttctgtgaatcagtttcc agtcagcccCGGGTTACGCCTGTTGTTTGTC
NGFBu3	NGFB	G	T	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	1002 TTTACAGAGGAGCTGACGTTTGctacactcctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaactaattccacaattacttgaccaagttgggggattatttgtgg ggtaactgcagtgcagtatggagtccgtaagaacaaacaatagaggacacactagcttagtaagggtc cacataagaacaaacaatagaggacacactagcttagtaagggtcaactttgaattcctaattgaactc agaaggaagggtggatggaaggacacactagcttagtaagggtcaactttgaattcctaattgaactc tcagttttcatttgtgacttcagtgcctagtgtgctttagtgttagttcatttctgtgaatcagtttcc atgtgaaataaatatgataaatcctaatgctgcttagtgttagttcatttctgtgaatcagtttcc atttaaaaacatcacacaaagaggatgctgcttagtgttagttcatttctgtgaatcagtttcc ctgaagaggtgcctggactaagatggatgctgcttagtgttagttcatttctgtgaatcagtttcc tgaattcataacaagggctccaagtgctgcttagtgttagttcatttctgtgaatcagtttcc g/t]gggtaccagttctgaggcttcaggtgctgcttagtgttagttcatttctgtgaatcagtttcc ggattcaaaactgttgagcaggacgggtgctgcttagtgttagttcatttctgtgaatcagtttcc aaactcttcccccaccaacctccctcagccgccttaactaattccacaattacttgaccaagttgggggattatttgtgg gcttcagagaacttcaaaggactcctgtcactgctgcttagtgttagttcatttctgtgaatcagtttcc atttcagggctcctgtcacttcctgggcaaaatgctgcttagtgttagttcatttctgtgaatcagtttcc agtcagcccCGGGTTACGCCTGTTGTTTGTC

FIG. 5BBBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBu4	NGFB	G	A	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaattccacaattacttgaccaagttgggggattatttgtgg ggtaactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatctatagt cacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggagggagaaa agaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttctggt tcagttttcatttgtgacttcagtgctttagtgttagttcatttttctgtgaatcagtttccttat atgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtgaacac attttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggtagcgt ctgaagaggtgcctggactaagatggtcccagagccacaaggtttttgccaaacatgacgctttg tgaattcataacaagggctccaagtcaccagatcttagagctgacccagtgcactgtctgaaagg gggtaccagttctgaggcttcaagacatgtccccagcagatcttccccgtgccttcccagaggat tcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagag[g/a]tgtt aaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaa gcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaa atttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctg agtcagccccGGGTTACGCCTGTTGTC	1002
NGFBu5	NGFB	T	C	V	A	cds	GE1185	CACATCCATAC TGCCTGAGT	AGGGGCCCAGG AGAGTG	CACATCCATACTGCCTGAGTcagccccgggttacgcctgttgtcccggtataaccattgctagca caccctttccctctcagaagtgccccggtttgaatgaaacctcttcgtgatccccttggaggtca actctgagggacccagaaactgccttttgactgcatttagtactccatgaagtcaccctcatttc tttttcattccaggtgcatagcgtaatgtccatgttgttctacactctgatcacagcttttctga tcggcatacaggcggaaccacactcagagagcaatgtccctgcaggacacaccatcccccaag[t /c]ccactggactaaacttcagcattcccttgacactgcccttcgcagagcccgcagcgccccgg cagcggcgatagctgcacgcgtggcggggcagacccgcaacattactgtggaccccaggctgttt aaaaagcggcgactccgttcaccccgtgtgctgtttagcacccagcctccccgtgaagctgcaga cactcaggatctggacttcgaggtcggtggtgctgccccctcaacaggactcacaggagcaagc ggtcatcatcccatcccatcttccacaggggcgaattctcggtgtgtgacagtgtcagcgtgtgg gttggggataagaccaccgccacagacatcaagggcaaggaggtgatggtgttgggagaggtgaa cattaacaacagtgtattcaaacagtacttttttgagaccaagtgccgggacccaaatcccgttg acagcgggtgccggggcattgactcaaagcactggaactcatattgtaccacgactcacacctttt gtcaaggcgctgaccatggatggcaagcaggctgcctggcggtttatccggatagatacggcctg tgtgtgtgtgctcagcaggaaggctgtgagaagagcctgacctgccgacacgctccctcccccctg ccccttctaCACTCTCCTGGGCCCCT	1001

FIG. 5CCCCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
NGFBu6	NGFB	T	C	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	1002 TTTACAGAGGAGCTGACGTTTGctacacatctac gagaggccctccaggagcagaactaattccacaa gtggggtaactgcagtgcagtatggagtccttctt tagtcacataagaacaaacaatataaaagaaaaga gaaaagaaggaagggtggatggaaggacactagc tggttcagttttcatttgtgacttcagtgcttta ttatatgtgaaataaatatgataaaatcctaattg acacattttaaaaacatcacacaaagaggaacta gcgtcctgaagaggtgcctggactaagatggtccc ttgttgaattcataacaagggctccaagtcaccaa aaggggtaccagttctgaggcttcaagacatgt ggattcaaaactgttgagcaggacggcaccatca aaactctccccaccaacctcccctggtacacacat gcttcagagaacttaccacctcccctcagccgccttaa atttcaggggctcttgtcacttcctggagaagctc agtcggatggggtgaccacatccatactgcctg
NGFBu7	NGFB	C	T	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTC	GACAACAGGCG TAACCCG	1002 TTTACAGAGGAGCTGACGTTTGctacacatctac gagaggccctccaggagcagaactaattccacaa ggtaactgcagtgcagtatggagtccttcttgggg cacataagaacaaacaatataaaagaaaagacatg agaaggaagggtggatggaaggacactagcttag tcagtttcatttgtgacttcagtgctttagtgt atgtgaaataaatatgataaatccctaattgaact atttaaaaacatcacacaaagaggaactattat ctgaagaggtgcctggactaagatggtcccagag tgaattcataacaagggctccaagtcaccagatc gggtaccagttctgaggcttcaagacatgtcccc ggattcaaaactgttgagcaggacggcaccatca aaactctccccaccaacctcccctggtacacacat gcttcagagaacttaccacctcccctcagccgccttaa attttaaaaacatcacacaaagaggaactaggtg agtcagccccGGGTTACGCCTGTTGTC

FIG. 5DDDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBu8	NGFB	G	C	-	-	noncoding	GE1185	CACATCCATAC TGCCTGAGT	AGGGGCCCAGG AGAGTG	CACATCCATACTGCCTGAGTcagccccgggttacgcctgttgtcccggtataaccattgctagca cacccttcccctctcagaagtgcccc[g/c]gtttgaatgaaacctcttcgtgatcccctggag gtcaactctgagggacccagaaactgccttttgactgcatttagtactccatgaagtcacctca tttcttttttcattccaggtgcatagcgtaatgtccatgttgttctacactctgatcacagctttt ctgatcggcatacaggcggaaccacactcagagagcaatgtccctgcaggacacaccatccccca agtccactggactaaacttcagcattcccttgacactgccctttcgcagagcccgcagcgccccgg cagcggcgatagctgcacgcgtggcggggcagacccgcaacattactgtggaccccaggctgttt aaaaagcggcgactccgttcaccccgtgtgctgtttagcacccagcctccccgtgaagctgcaga cactcaggatctggacttcgaggtcggtggtgctgccccctttcaacaggactcacaggagcaagc ggtcatcatcccatcccatcttccacaggggcgaattctcggtgtgtgacagtgtcagcgtgtgg gttggggataagaccaccgccacagacatcaagggcaaggaggtgatggtgttgggagaggtgaa cattaacaacagtgtattcaaacagtacttttttgagaccaagtgccgggacccaaatcccgttg acagcgggtgccggggcattgactcaaagcactggaactcatattgtaccacgactcacacctttt gtcaaggcgctgaccatggatggcaagcaggctgcctggcggtttatccggatagatacggcctg tgtgtgtgtgctcagcaggaaggctgtgagaagagcctgacctgccgacacgctccctccccctg ccccttctaCACTCTCCTGGGCCCCT	1001
NT3u1	NT3	A	G	P	P	cds	GE1317	CCTTTTCAGAT CTTACAGGTGA	AAGCACACTGA TTTTATTGAGA A	CCTTTTCAGATCTTACAGGTGAacaaggtgatgtccatcttgttttatgtgatatttctcgctta tctccgtggcatccaaggtaacaacatggatcaaaggagtttgccagaagactcgctcaattccc tcattattaagctgatccaggcagatattttgaaaaacaagctctccaagcagatggtggacgtt aaggaaaattaccagagcaccctgcccaaagctgaggctccccgagagccggagcggggagggcc cgccaagtcagcattccagcc[a/g]gtgattgcaatggacaccgaactgctgcgacaacagaga cgctacaactcaccgcgggtcctgctgagcgacagcacccccttggagccccgcccttgtatct catggaggattacgtgggcagccccgtggtggcgaacagaacatcacggcggaaacggtacgcgg agcataagagtcaccgaggggagtactcggtatgtgacagtgagagtctgtgggtgaccgacaag tcatcggccatcgacattcggggacaccaggtcacggtgctgggggagatcaaaacgggcaactc tcccgtcaaacaatatttttatgaaacgcgatgtaaggaagccaggccggtcaaaaacggttgca ggggtattgatgataaacactggaactctcagtgcaaaacatcccaaacctacgtccgagcactg acttcagagaacaataaactcgtgggctggcggtggatacggatagacacgtcctgtgtgtgtgc cttgtcgagaaaaatcggaagaacatgaattggcatctctcccatatataaattattactttaa attatatgatatgcatgtagcatataaatgtttatattgtttttatatattataagttgacctttt atttattaaacttcagcaaccctacagtatataagcttttTTCTCAATAAAATCAGTGTGCTT	973
NT3u2	NT3	C	T	P	P	cds	GE1317	CCTTTTCAGAT CTTACAGGTGA	AAGCACACTGA TTTTATTGAGA A	CCTTTTCAGATCTTACAGGTGAacaaggtgatgtccatcttgttttatgtgatatttctcgctta tctccgtggcatccaaggtaacaacatggatcaaaggagtttgccagaagactcgctcaattccc tcattattaagctgatccaggcagatattttgaaaaacaagctctccaagcagatggtggacgtt aaggaaaattaccagagcaccctgcccaaagctgaggctccccgagagccggagcggggagggcc cgccaagtcagcattccagccagtgattgcaatggacaccgaactgctgcgacaacagagacgct acaactcaccgcgggtcctgctgagcgacagcacccccttggagccccgcccttgtatctcatg gaggattacgtgggcagccccgtggtggcgaacagaacatcacggcggaaacggtacgcggagca taagagtcaccgaggggagtactcggtatgtgacagtgagagtctgtgggtgaccgacaagtcat cggccatcgacattcggggacaccaggtcacggtgctgggggagatcaaaacgggcaactctcc[c/t]gtcaaacaatatttttatgaaacgcgatgtaaggaagccaggccggtcaaaaacggttgca ggggtattgatgataaacactggaactctcagtgcaaaacatcccaaacctacgtccgagcactg acttcagagaacaataaactcgtgggctggcggtggatacggatagacacgtcctgtgtgtgtgc cttgtcgagaaaaatcggaagaacatgaattggcatctctccccatatataaattattactttaa attatatgatatgcatgtagcatataaatgtttatattgtttttatatattataagttgacctttt atttattaaacttcagcaaccctacagtatataagcttttTTCTCAATAAAATCAGTGTGCTT	973

FIG. 5EEEEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NTRK1d10	NTRK1	C	T	-	-	noncoding	GE1290	GCTGCCCTGGG TGAACA	GGGATGTCTAT AGGGAAGGGA	GCTGCCCTGGGTGAACAgcagtgaggct[c/t]ggcccccaactcagtcctgtccctgccgcttc catccaggcactgaaggaggcgtccgagagtgctcggcaggacttccaacgtgaggctgagctgc tcaccatgctgcagcaccagcacatcgtgcgcttcttcggcgtctgcaccgagggccgccccctg ctcatggtcttcgagtatatgcggcacggggacctcaaccgcttcctccggtaccagcacctggc ctcagcgctggccccggcccctggctctgggccccgtctTCCCTTCCCTATAGACATCCC	320
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NTRK1u1	NTRK1	A	G	Q	Q	cds	GE1290	GCTGCCCTGGG TGAACA	GGGATGTCTAT AGGGAAGGGA	GCTGCCCTGGGTGAACAgcagtgaggctcggcccccaactcagtcctgtccctgccgcttccatc caggcactgaaggaggcgtccgagagtgctcggcaggacttcca[a/g]cgtgaggctgagctgc tcaccatgctgcagcaccagcacatcgtgcgcttcttcggcgtctgcaccgagggccgccccctg ctcatggtcttcgagtatatgcggcacggggacctcaaccgcttcctccggtaccagcacctggc ctcagcgctggccccggcccctggctctgggccccgtctTCCCTTCCCTATAGACATCCC	320
NTRK1u2	NTRK1	C	T	F	F	cds	GE1290	GCTGCCCTGGG TGAACA	GGGATGTCTAT AGGGAAGGGA	GCTGCCCTGGGTGAACAgcagtgaggctcggcccccaactcagtcctgtccctgccgcttccatc caggcactgaaggaggcgtccgagagtgctcggcaggacttccaacgtgaggctgagctgctcac catgctgcagcaccagcacatcgtgcgcttctt[c/t]ggcgtctgcaccgagggccgccccctg ctcatggtcttcgagtatatgcggcacggggacctcaaccgcttcctccggtaccagcacctggc ctcagcgctggccccggcccctggctctgggccccgtctTCCCTTCCCTATAGACATCCC	320
NTRK1u3	NTRK1	C	T	H	Y	cds	GE1129	CAGGCTCCTGG GAGTTCTATC	CCAGGGTGTCT ACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctccttttcttgttcacagatcc[c/t]atggacccgatgccaagctgctggctggtggggaggatgtggctccaggcccctgggtctggg gcagctgctggccgtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcattttg tgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgat tttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacg ccttcccctgcATCCAAACTGTAGACACCCTGG	358
NTRK1u4	NTRK1	C	T	A	A	cds	GE1129	CAGGCTCCTGG GAGTTCTATC	CCAGGGTGTCT ACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctccttttcttgttcacagatcccatg gacccgatgccaagctgctggctggtggggaggatgtggctccaggcccctgggtctggggcag ctgctggc[c/t]gtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcattttg tgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgat tttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacg ccttcccctgcATCCAAACTGTAGACACCCTGG	358
NTRK1u5	NTRK1	T	G	-	-	noncoding	GE1067	GGAGGCTCTGA GAGTACAGGAG	AGTAGGAAACA AAGCCAGGAG	GGAGGCTCTGAGAGTACAGGAGgagcccctggatctaactacccctgtcccccaccaggtctcgg tggctgtgggcctggccgtctttgcctgcctcttcctttctacgctgctccttgtgctcaacaaa tgtggacggagaaacaagtttgggatcaaccg[t/g]agtcggggctgcagagggctgtctgtct gtctgttCTCCTGGCTTTGTTTCCTACT	223
NTRK1u6	NTRK1	C	T	G	G	cds	GE1129	CAGGCTCCTGG GAGTTCTATC	CCAGGGTGTCT ACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctccttttcttgttcacagatcccatg gacccgatgccaagctgctggctggtggggaggatgtggctccagg[c/t]cccctgggtctggg gcagctgctggccgtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcattttg tgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgat tttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacg ccttcccctgcATCCAAACTGTAGACACCCTGG	358

FIG. 5FFFFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NTRK1u 7	NTRK1	G	T	G	V	cds	GE1129	CAGGCTCCTGG GAGTTCTATC	CCAGGGTGTCT ACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctcctttcttgttcacagatcccatg gacccgatgccaagctgctggctg[g/t]tggggaggatgtggctccaggccccctgggtctggg gcagctgctggccgtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcattttg tgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgat tttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacg ccttcccctgcATCCAAACTGTAGACACCCTGG	358
NTRK1u 8	NTRK1	C	T	F	F	cds	GE1042	CCAGGGGCCCG AGTAGC	AGCCCAAGTCT GGGTGTCCT	CCAGGGGCCCGAGTAGCtgagacctggggactgatcctcctgcacccctccccagcaccatcgtg aagagtggtctccgttt[c/t]gtggcgccagatgccttccatttcactcctcggctcagtcgcc tgtgagtgtggccagtgctgggcagtgggagttggggAGGACACCCAGACTTGGGCT	187
PACEd1 2	PACE	g	T	-	-	noncoding	GE1219	GAGTCGCAGGG GGTGCC	AGCAAAGGCAA GCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcaca gagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcctgggcgagcccaaccac atcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggc catccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctctgtc cctgcccgccctgcccagcgccgcc[g/t]cctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEd1 3	PACE	G	T	R	R	cds	GE1219	GAGTCGCAGGG GGTGCC	AGCAAAGGCAA GCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcaca gagacatcgggaaacg[g/t]ctcgaggtgcggaagaccgtgaccgcgtgcctgggcgagcccaa ccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacc tggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctc tgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEu1	PACE	C	G	G	G	cds	GE687	GTCTGTTTAGC TGACACACACT T	CAGCTGGGGTC CAAACC	GTCTGTTTAGCTGACACACACTTgccctctctcccacgccggcagtgtgcgaggaaggcttctcc ctgcaccagaagagctgtgtccagcactgccctccagg[c/g]ttcgccccccaagtcctcgata cgcactatagcaccgagaatgacgtggagaccatccgggccagcgtctgcgcccccctgccacgcc tcatgtgccacatgccaggggccggccctgacagactgcctcagctgccccagccacgcctcctt ggaccctgtggagcagacttgctcccggcaaagccagagcagccgagagtccccgccacagcagc agccacctcggctgcccccggaggtggaggcggggcaacggctgcgggcagggctgctgccctca cacctgcctgaggtggtggccggcctcagctgcgccttcatcgtgctggtcttcgtcactgtctt cctggtcctgcagctgcgctctggctttagttttcgggggggtgaaggtgtacaccatggaccgtg gcctcatctcctacaaggggctgccccctgaagcctggcaggaggagtgcccgtctgactcagaa gaggacgagggccggggcgagaggaccgcctttatcaaagaccagagcgccctctgatgagccca ctgcccacccccctcaagccaatcccctccttgggcacttttttaattcaccaaagtatttttttat cttgggactgGGTTTGGACCCCAGCTG	742
PACEu1 0	PACE	G	A	G	S	cds	GE548	GAGAGCTGCTC CCAAAAA	ACCTAACTCCA CATCCAGCC	GAGAGCTGCTCCCAAAAAagactgatccccagcctctcccttccttctttgcagtaagaacctca catggcgggacatgcaacacctggtggtacagacctcgaagccagcccacctcaatgccaacgac tgggccaccaat[g/a]gtgtgggccggaaaggtgagggcaggctggcccggcaGGCTGGATGTG GAGTTAGGT	204
PACEu1 1	PACE	T	A	L	Q	cds	GE1219	GAGTCGCAGGG GGTGCC	AGCAAAGGCAA GCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcaca gagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcctgggcgagcccaaccac atcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggc catccacc[t/a]ggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctc tgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320

FIG. 5GGGGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PACEu2	PACE	G	C	S	T	cds	GE687	GTCTGTTTAGC TGACACACACT T	CAGCTGGGGTC CAAACC	GTCTGTTTAGCTGACACACACTTgccctctctcccacgccggcagtgtgcgaggaaggcttctcc ctgcaccagaagagctgtgtccagcactgccctccaggcttcgccccccaagtcctcgatacgca ctatagcaccgagaatgacgtggagaccatccgggccagcgtctgcgcccccctgccacgcctcat gtgccacatgccaggggccggccctgacagactgcctcagctgccccagccacgcctccttggac cctgtggagcagacttgctcccggcaaagccagagcagccgagagtccccgccacagcagcagcc acctcggctgccccccggaggtggaggcggggcaacggctgcgggcagggctgctgccctcacacc tgcctgaggtggtggccggcctcagctgcgccttcatcgtgctggtcttcgtcactgtcttcctg gtcctgcagctgcgctctggctttagttttcgggggggtgaaggtgtacaccatggaccgtggcct catctcctacaaggggctgccccctgaagcctggcaggaggagtgcccgtctgactcagaagagg acgagggccggggcgagaggaccgcctttatcaaagaccaga[g/c]cgccctctgatgagccca ctgcccaccccctcaagccaatccccctccttgggcacttttttaattcaccaaagtatttttttat cttgggactgGGTTTGGACCCCAGCTG	742
PACEu3	PACE	C	T	-	-	noncoding	GE590	GTCCACAGGGC CGAGGG	AGCCCCATCTC CCCAGC	GTCCACAGGGCCGAGGGgggctgggctccatctttgtctgggc[c/t]tcggggaacgggggccg ggaacatgacagctgcaactgcgacggctacaccaacagtatctacacgctgtccatcagcagcg ccacgcagtttggcaacgtgccgtggtacagcgaggcctgctcgtccacactggccacgacctac agcagtggcaaccagaatgagaagcagatcgtgagtcttacctgggggtggggGCTGGGGAGATG GGGCT	265
PACEu4	PACE	G	C	L	L	cds	GE1219	GAGTCGCAGGG GGTGCC	AGCAAAGGCAA GCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcaca gagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcct[g/c]ggcgagcccaa ccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacc tggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctc tgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEu5	PACE	C	T	G	G	cds	GE1219	GAGTCGCAGGG GGTGCC	AGCAAAGGCAA GCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcaca gagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcctggg[c/t]gagcccaa ccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacc tggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctc tgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEu6	PACE	T	C	-	-	noncoding	GE1195	AGCCAATCCCC TCCTTGG	CAGCATCGGGT GGGAGG	AGCCAATCCCCTCCTTGGgcacttttttaattcaccaaagtatttttttatcttgggactgggttt ggacccccagctgggaggcaagaggggtggagactg[t/c]ttcccatcctaccctcgggcccacc tggccacctgaggtgggcccaggaccagctggggcgtggggagggccgtaccccacccctcagcac cccttccatgtggagaaaggagtgaaacctttagggcagcttgccccggccccggccccagccag agttcctgcggagtgaagaggggcagcccttgcttgttgggattcctgacccaggccgcagctct tgcccttccctgtccctctaaagcaataatggtcccatccaggcagtcgggggctggcctaggag atatctgagggaggaggccacctctccaagggcttctgcaccctccacccctgtccccagctctg gtgagtcttggcggcagccatcataggaagggaccaaggcaaggcaggtgcctccaggtgtg cacgtggcatgtggcctgtggcctgtgtcccatgacccacccctgtgctccgtgcctccaccacc actggccaccaggctggcgcagccaaggccgaagctctggctgaaccctgtgctggtgtcctgac caccctcccctctcttgcacccgcctctcccgtcagggcccaagtccctgttttctgagcccggg ctgcctgggctgttggcactcacagacctggagccctgggtgggtggtggggaggggcgctggc ccagccggcctctctggCCTCCCACCCGATGCTG	814

FIG. 5HHHHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PACEu7	PACE	G	A	-	-	noncoding	GE1195	AGCCAATCCCC TCCTTGG	CAGCATCGGGT GGGAGG	AGCCAATCCCCTCCTTGGgactttttaattcaccaaagtatttttttatcttgggactgggttt ggaccccagctgggaggcaagaggggtggagactgtttcccatcctaccctcgggcccacctggc cacctgaggtgggcccaggaccagctggggcgtggggagggccgtaccccaccctcagcaccctt tccatgtggagaaaggagtgaaaccttagggcagcttgccccggccccggccccagccagagtt cctgcggagtgaagaggggcagcccttgcttgttgggattcctgacccaggccgcagctcttgcc cttccctgtccctctaaagcaataatggtcccatccag[g/a]cagtcgggggctggcctaggag atatctgagggaggaggccacctctccaagggcttctgcaccctccaccctgtccccagctctg gtgagtcttggcggcagcagccatcataggaagggaccaaggcaaggcaggtgcctccaggtgtg cacgtggcatgtggcctgtggcctgtgtcccatgacccacccctgtgctccgtgcctccaccacc actggccaccaggctggcgcagccaaggccgaagctctggctgaaccctgtgctggtgtcctgac caccctccctctcttgcacccgcctctcccgtcagggcccaagtccctgtttttctgagcccggg ctgcctgggctgttggcactcacagacctggagccccctgggtgggtggtggggagggcgctggc ccagccggcctctctggCCTCCCACCCGATGCTG	814
PACEu8	PACE	C	T	-	-	noncoding	GE1195	AGCCAATCCCC TCCTTGG	CAGCATCGGGT GGGAGG	AGCCAATCCCCTCCTTGGgactttttaattcaccaaagtatttttttatcttgggactgggttt ggaccccagctgggaggcaagaggggtggagactgtttcccatcctaccctcgggcccacctggc cacctgaggtgggcccaggaccagctggggcgtggggagggccgtaccccaccctcagcaccctt tccatgtggagaaaggagtgaaaccttagggcagcttgccccggccccggccccagccagagtt cctgcggagtgaagaggggcagcccttgcttgttgggattcctgacccaggccgcagctcttgcc cttccctgtccctctaaagcaataatggtcccatccaggcagtcgggggctggcctaggagatat ctgagggaggaggccacctctccaagggcttctgcaccctccaccctgtccccagctctggtga gtcttggcggcagcagccatcataggaagggaccaaggcaaggcaggtgcctccaggtgtgcacg tggcatgtggcctgtggcctgtgtcccatgacccacccctgtgctccgtgcctccaccaccactg gccaccaggctggcgcagccaagg[c/t]cgaagctctggctgaaccctgtgctggtgtcctgac caccctccctctcttgcacccgcctctcccgtcagggcccaagtccctgtttttctgagcccggg ctgcctgggctgttggcactcacagacctggagccccctgggtgggtggtggggagggcgctggc ccagccggcctctctggCCTCCCACCCGATGCTG	814
PACEu9	PACE	G	C	L	L	cds	GE590	GTCCACAGGGC CGAGGG	AGCCCCATCTC CCCAGC	GTCCACAGGGCCGAGGGgggctgggctccatctttgtctgggcctcggggaacgggggccgggaa catgacagctgcaactgcgacggctacaccaacagtatctacacgct[g/c]tccatcagcagcg ccacgcagtttggcaacgtgccgtggtacagcgaggcctgctcgtccacactggccacgacctac agcagtggcaaccagaatgagaagcagatcgtgagtcttacctgggggtggggGCTGGGGAGATG GGGCT	265
PAI1d10	PAI1	C	T	-	-	noncoding	GE285	GGGAGACCCTG TCTCTAAGAA	GTCTGCATCTG TCGGGACTA	GGGAGACCCTGTCTCTAAGAAaaacggcgggggtgggggtggtgccagtgccagcatccctctgt tctaagacattgtcccttctcttgcagctgtcatagtctcagcccgcatggcccccgaggagatc atcatggacagacccttcctctttgtggtccggcacaaccccacaggtgagcctggaacccatca [c/t]gttccacatcctcccacccattctttctctcaggaacTAGTCCCGACAGATGCAGAC	257
PAI1d11	PAI1	G	A	-	-	noncoding	GE384	AGAAGAGCAGG GCCCACAG	CCAGCCTTTCC TTGGCTTC	AGAAGAGCAGGGCCCACAGctggccagctcccctccccctccc[g/a]cctgtcttccagaacgat tccttcaccagccctctttccattgctctaggatgcagatgtctccagccctcacctgcctagtc ctgggcctggcccttgtctttggtgaagggtctgctgtgcaccatcccccatcctacgtggccca cctggcctcagacttcggggtgagggtgtttcagcaggtggcgcaggcctccaaggaccgcaacg tggttttctcaccctatggggtggcctcggtgttggccatgctccagctgacaacaggaggagaa acccagcagcagattcaagcagctatgggattcaagattgatggtgagccacgggacaccagggg aggtgggtggcatgcagaacagacctaccaGAAGCCAAGGAAAGGCTGG	439

FIG. 5IIIIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI1u1	PAI1	T	G	S	A	cds	GE268	GCCCCTAAGAG GAAAAAGGAA	GGGTCTGGGGA CCAGTTATC	GCCCCTAAGAGGAAAAAGGAAcctctccttgagagcggcagcgatctaatcctgtatccacatct gtttgcagaccaagagcctctccacgtcgcgcaggcgctgcagaaagtgaagatcgaggtgaacg agagtggcacggtggcctcctca[t/g]ccacaggtgagtctggctcaggtgaggctccacgggt gtcgcctccatcgcccttcagGATAACTGGTCCCCAGACCC	236
PAI1u2	PAI1	G	A	V	I	cds	GE384	AGAAGAGCAGG GCCCACAG	CCAGCCTTTCC TTGGCTTC	AGAAGAGCAGGGCCCACAGctggccagctcccctcccctcccgcctgtcttccagaacgattcct tcaccagccctctttccattgctctaggatgcagatgtctccagccctcacctgcctagtcctgg gcctggcccttg/a]tctttggtgaagggtctgctgtgcaccatcccccatcctacgtggccca cctggcctcagacttcggggtgagggtgtttcagcaggtggcgcaggcctccaaggaccgcaacg tggttttctcaccctatggggtggcctcggtgttggccatgctccagctgacaacaggaggagaa acccagcagcagattcaagcagctatgggattcaagattgatggtgagccacgggacaccagggg aggtgggtggcatgcagaacagacctaccaGAAGCCAAGGAAAGGCTGG	439
PAI1u3	PAI1	G	A	A	A	cds	GE379	GGTAGCCCCCA TCCATCAG	CAACTGGGATA TGTGGATTTAT TT	GGTAGCCCCCATCCATCAGagtggagcccctgtgggggaagtgggctcggctgggaaccctcaa ttcagcataagcctcacatgtcctctcctctctgtcccggtgcagacaagggcatggcccccgcc ctccggcatctgtacaaggagctcatggggccatggaacaaggatgagatcagcaccacagacgc [g/a]atcttcgtccagcgggatctgaagctggtccagggcttcatgccccacttcttcaggctg ttccggagcacggtcaagcaagtggacttttcagaggtggagagagccagattcatcatcaatga ctgggtgaagacacacacaaaaggtgagcaggcagggaaaggaaacccatttcctgggcctcaag agaaagggaatttggAAATAAATCCACATATCCCAGTTG	429
PAI1u4	PAI1	G	A	A	T	cds	GE384	AGAAGAGCAGG GCCCACAG	CCAGCCTTTCC TTGGCTTC	AGAAGAGCAGGGCCCACAGctggccagctcccctcccctcccgcctgtcttccagaacgattcct tcaccagccctctttccattgctctaggatgcagatgtctccagccctcacctgcctagtcctgg gcctg[g/a]cccttgtctttggtgaagggtctgctgtgcaccatcccccatcctacgtggccca cctggcctcagacttcggggtgagggtgtttcagcaggtggcgcaggcctccaaggaccgcaacg tggttttctcaccctatggggtggcctcggtgttggccatgctccagctgacaacaggaggagaa acccagcagcagattcaagcagctatgggattcaagattgatggtgagccacgggacaccagggg aggtgggtggcatgcagaacagacctaccaGAAGCCAAGGAAAGGCTGG	439
PAI1u5	PAI1	A	G	D	G	cds	GE379	GGTAGCCCCCA TCCATCAG	CAACTGGGATA TGTGGATTTAT TT	GGTAGCCCCCATCCATCAGagtggagcccctgtgggggaagtgggctcggctgggaaccctcaa ttcagcataagcctcacatgtcctctcctctctgtcccggtgcagacaagggcatggcccccgcc ctccggcatctgtacaaggagctcatggggccatggaacaagg[a/g]tgagatcagcaccacag acgcgatcttcgtccagcgggatctgaagctggtccagggcttcatgccccacttcttcaggctg ttccggagcacggtcaagcaagtggacttttcagaggtggagagagccagattcatcatcaatga ctgggtgaagacacacacaaaaggtgagcaggcagggaaaggaaacccatttcctgggcctcaag agaaagggaatttggAAATAAATCCACATATCCCAGTTG	429
PAI1u6	PAI1	G	C	G	R	cds	GE363	AACTAGGTGAA AACCCAGTGCT	GTCCTGCAAGC GTCACAGAT	AACTAGGTGAAAACCCAGTGCTgggttgccatcagcaagagctggagccatttccaacgaaccat cttgtcgtcttcacagctgagttcaccacgcccgatggccattactacgacatcctggaactgcc ctaccac[g/c]gggacaccctcagcatgttcattgctgccccttatgaaaaagaggtgcctctc tctgccctcaccaacattctgagtgcccagctcatcagccactggaaaggcaacatgaccaggct gccccgcctcctggttctgcccaagtaagccaccccgctatctccccgacctaccaaccctctc tcctggctccctaaagtcaccgcccccaggttgaatttcccagATCTGTGACGCTTGCAGGAC	388

FIG. 5JJJJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI1u7	PAI1	A	T	I	F	cds	GE379	GGTAGCCCCCA TCCATCAG	CAACTGGGATA TGTGGATTTAT TT	GGTAGCCCCCATCCATCAGagtggagccccttgtgggggaagtgggctcggctgggaaccctcaa ttcagcataagcctcacatgtcctctcctctctgtcccggtgcagacaagggcatggccccgcc ctccggcatctgtacaaggagctcatggggccatggaacaaggatgagatcagcaccacagacgc g[a/t]tcttcgtccagcgggatctgaagctggtccagggcttcatgccccacttcttcaggctg ttccggagcacggtcaagcaagtggacttttcagaggtggagagagccagattcatcatcaatga ctgggtgaagacacacacaaaaggtgagcaggcagggaaaggaaacccatttcctgggcctcaag agaaagggaatttggAAATAAATCCACATATCCCAGTTG	429
PAI1u8	PAI1	A	T	L	L	cds	GE298	GTAGGGGATGG GGAAAGGT	TCTCAAGGAGA GGTTCCTTTTT	GTAGGGGATGGGGAAAGGTgggagctgccagccagaggggggaccccggcttgagcagcctcttgc tgctatctgcaggttctccctggagactgaagtcgacctcaggaagcccct[a/t]gagaacctg ggaatgaccgacatgttcagacagtttcaggctgacttcacgagtctttcaggtaagaagacttt cctttgcatttttctcaccccagtggactgcgggggcccctaagaggAAAAAGGAACCTCTCCTTG AGA	263
PAI1u9	PAI1	A	T	-	-	noncoding	GE285	GGGAGACCCTG TCTCTAAGAA	GTCTGCATCTG TCGGGACTA	GGGAGACCCTGTCTCTAAGAAaaacggcgggggtgggggtggtgccagtgccagcatccctctgt tctaagacattgtcccttctcttgc[a/t]gctgtcatagtctcagcccgcatggccccccgagga gatcatcatggacagacccttcctctttgtggtccggcacaaccccacaggtgagcctggaaccc atcacgttccacatcctcccacccattctttctctcaggaacTAGTCCCGACAGATGCAGAC	257
PAI2d15	PAI2	C	T	-	-	noncoding	GE341	TCCTACTGTTG CTGACCTCAC	GCATAAACAAG AGCAGTTCTCC A	TCCTACTGTTGCTGACCTCACccaaaatgttaccttatgtttcagagctgtttttttcttcctct ctttgcttctagattgaaacaatggaggatctttgtgtggcaaacacactctttgccctcaattt attcaagcatctggcaaaagcaagccccacccagaacctcttcctctccccatggagcatctcgt ccaccatggccatggtctacatgggctccaggggcagcaccgaagaccagatggccaaggtgagt ttgagctgaagctccacatttgggc[c/t]gagtagttcctgaatggaatTGGAGAACTGCTCTT GTTTATGC	333
PAI2d16	PAI2	T	G	-	-	noncoding	GE341	TCCTACTGTTG CTGACCTCAC	GCATAAACAAG AGCAGTTCTCC A	TCCTACTGTTGCTGACCTCACccaaaatgttaccttatgtttcagagctgtttttttcttcctct ctttgcttctagattgaaacaatggaggatctttgtgtggcaaacacactctttgccctcaattt attcaagcatctggcaaaagcaagccccacccagaacctcttcctctccccatggagcatctcgt ccaccatggccatggtctacatgggctccaggggcagcaccgaagaccagatggccaaggtgagt *ttgagctgaagctccacatttgggccgag[t/g]agttcctgaatggaat*TGGAGAACTGCTCTT GTTTATGC	333
PAI2d17	PAI2	C	G	-	-	noncoding	GE341	TCCTACTGTTG CTGACCTCAC	GCATAAACAAG AGCAGTTCTCC A	TCCTACTGTTGCTGACCTCACccaaaatgttaccttatgtttcagagctgtttttttcttcct[c /g]tctttgcttctagattgaaacaatggaggatctttgtgtggcaaacacactctttgccctca atttattcaagcatctggcaaaagcaagccccacccagaacctcttcctctccccatggagcatc tcgtccaccatggccatggtctacatgggctccaggggcagcaccgaagaccagatggccaaggt gagtttgagctgaagctccacatttgggccgagtagttcctgaatggaatTGGAGAACTGCTCTT GTTTATGC	333
PAI2d18	PAI2	G	A	-	-	noncoding	GE318	CCACCTGATAG CCATCTGTTTT	CCAGTCTGACA CTGTGGCTTTA	CCACCTGATAGCCATCTGTTTTaaaagttcagtaaatccgtgggcaagtgtaacc[g/a]ttttc tctaattctgattgcaggtgcttcagtttaatgaagtgggagccaatgcagttacccccatgact ccagagaactttaccagctgtgggttcatgcagcagatccagaagggtagttatcctgatgcgat tttgcaggtatctgacttactggtccaaatttcttttgtggtttatttttgcaatcttcctgtct TAAAGCCACAGTGTCAGACTGG	282
PAI2d19	PAI2	C	A	N	K	cds	GE318	CCACCTGATAG CCATCTGTTTT	CCAGTCTGACA CTGTGGCTTTA	CCACCTGATAGCCATCTGTTTTaaaagttcagtaaatccgtgggcaagtgtaaccgttttctcta attctgattgcaggtgcttcagtttaatgaagtgggagccaatgcagttacccccatgactccag agaa[c/a]tttaccagctgtgggttcatgcagcagatccagaagggtagttatcctgatgcgat tttgcaggtatctgacttactggtccaaatttcttttgtggtttatttttgcaatcttcctgtct TAAAGCCACAGTGTCAGACTGG	282

FIG. 5KKKKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2d20	PAI2	G	C	A	A	cds	GE318	CCACCTGATAG CCATCTGTTTT	CCAGTCTGACA CTGTGGCTTTA	CCACCTGATAGCCATCTGTTTTaaaagttcagtaaatccgtgggcaagtgtaaccgttttctcta attctgattgcaggtgcttcagtttaatgaagtgggagccaatgcagttacccccatgactccag agaactttaccagctgtgggttcatgcagcagatccagaagggtagttatcctgatgc[g/c]at ttgcaggtatctgacttactggtccaaatttcttttgtggtttatttttgcaatcttcctgtct TAAAGCCACAGTGTCAGACTGG	282
PAI2d21	PAI2	T	C	-	-	noncoding	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgatttttaatattagacttaaag ttgttttccttctttctaatacttgctgtaatttttcttttgtttgttttgttttg[t/c]tttgc tttgcagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatgg ctgaagatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatcc attctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtc ggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagg gcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacag tttgtggcagatcatccttttctttttcttattatgcataagataaccaactgcattttatttt cggcagattttcctcaccctaaaactaagcgtgctgcttctgcaaaagatttttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2d22	PAI2	C	T	-	-	noncoding	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgatttttaatattagacttaaag ttgttttccttctttctaatacttgctgtaatttttcttttgtttgttttgttttgttttgctttg cagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctga agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattc ttgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggag aggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcac tgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttg tggcagatcatccttttctttttcttattatgcataagataaccaactgcattttatttttcggc agattttcctcaccctaaaactaagcgtg[c/t]tgcttctgcaaaagatttttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2d23	PAI2	T	A	-	-	noncoding	GE367	CAGAGTACCCA CTGTAAAGCAT GT	TTACCACACCA TTTGTAAGGAG TAT	CAGAGTACCCACTGTAAAGCATGTacaaataatttatttttgttgatttaaaaaaatcacattnnn nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnatcttataatcgacttccatattttacctttaataat attaggctcagcgcacacctgtacagatgatgtacttgcgtgaaaagctaaacattggatacata gaagacctaaaggctcagattctagaactcccatatgctggagatgttagcatgttcttgttgct tccagatgaaattgccgatgtgtccactggcttggagctggtaagacattcagatatt[t/a]aa gtttctggggctatacctacctttcgtgagatgagatgaatatATACTCCTTACAAATGGTGTGG TAA	393
PAI2d24	PAI2	A	T	-	-	noncoding	GE367	CAGAGTACCCA CTGTAAAGCAT GT	TTACCACACCA TTTGTAAGGAG TAT	CAGAGTACCCACTGTAAAGCATGTacaaataatttatttttgttgatttaaaaaaatcacattnnn nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnatcttataatcgacttccatattttacctttaataat attaggctcagcgcacacctgtacagatgatgtacttgcgtgaaaagctaaacattggatacata gaagacctaaaggctcagattctagaactcccatatgctggagatgttagcatgttcttgttgct tccagatgaaattgccgatgtgtccactggcttggagctggtaagacattcagatattt[a/t]a gtttctggggctatacctacctttcgtgagatgagatgaatatATACTCCTTACAAATGGTGTGG TAA	393

FIG. 5LLLLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2u1	PAI2	A	G	N	D	cds	GE315	AAAACTATTAC CATGGCTTAAG AACTA	TTGAATTGTAG AGAACTGCTTT GAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattcc ttcttttcttttcaaggcacaagctgcagataaaatccattcatccttccgctctctcagctctgc aatcaatgcatccacaggg[a/g]attatttactggaaagtgtcaataagctgtttggtgagaag tctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatg aagtcactTTCAAAGCAGTTCTCTACAATTCAA	293
PAI2u1 0	PAI2	C	G	V	V	cds	GE333	TGGCTACTCAG AACATTCAGTA AGT	GAGCGGTCTCT AATTTTCTGTC TAT	TGGCTACTCAGAACATTCAGTAAGTaatttcacagttcttgattatgaaacctaaatatatgtta tgttttctgtaggcaaaatcccaaacttgttacctgaaggttctgtagatggggataccaggatg gt[c/g]ctggtgaatgctgtctacttcaaaggaaagtggaaaactccatttgagaagaaactaa atgggctttatcctttccgtgtaaactcggtatgagacaacaaaatacatcttcctagcatatat tttagggcttttgacaagatATAGACAGAAAATTAGAGACCGCTC	305
PAI2u1 1	PAI2	G	A	-	-	noncoding	GE333	TGGCTACTCAG AACATTCAGTA AGT	GAGCGGTCTCT AATTTTCTGTC TAT	TGGCTACTCAGAACATTCAGTAAGTaatttcacagttcttgattatgaaacctaaatatatgtta tgttttct[g/a]taggcaaaatcccaaacttgttacctgaaggttctgtagatggggataccag gatggtcctggtgaatgctgtctacttcaaaggaaagtggaaaactccatttgagaagaaactaa atgggctttatcctttccgtgtaaactcggtatgagacaacaaaatacatcttcctagcatatat tttagggcttttgacaagatATAGACAGAAAATTAGAGACCGCTC	305
PAI2u1 2	PAI2	G	A	R	H	cds	GE367	CAGAGTACCCA CTGTAAAGCAT GT	TTACCACACCA TTTGTAAGGAG TAT	CAGAGTACCCACTGTAAAGCATGTacaaataatttattttgttgatttaaaaaaatcacattnnnn nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnatcttataatcgacttccatattttacctttttaataat attaggctcagc[g/a]cacacctgtacagatgatgtacttgcgtgaaaagctaaacattggata catagaagacctaaaggctcagattctagaactcccatatgctggagatgttagcatgttcttgt tgcttccagatgaaattgccgatgtgtccactggcttggagctggtaagacattcagatatttaa gtttctggggctatacctacctttcgtgagatgagatgaatatATACTCCTTACAAATGGTGTGG TAA	393
PAI2u1 3	PAI2	T	A	D	E	cds	GE315	AAAACTATTAC CATGGCTTAAG AACTA	TTGAATTGTAG AGAACTGCTTT GAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattcc ttcttttcttttcaaggcacaagctgcaga[t/a]aaaatccattcatccttccgctctctcagct ctgcaatcaatgcatccacagggaattatttactggaaagtgtcaataagctgtttggtgagaag tctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatg aagtcactTTCAAAGCAGTTCTCTACAATTCAA	293
PAI2u1 4	PAI2	G	A	K	K	cds	GE312	GGGAAGACCAT AATTCACCATT	CTAAGTTCATG GATGGAAAAAG ATA	GGGAAGACCATAATTCACCATTatgccatggcttgtttggtatgtattttatgtagcctttgtca ttttcttgctttaaaggaatatattcgactctgtcagaaatattactcctcagaaccccaggcag tagacttcctagaatgtgcagaagaagctagaaaaaa[g/a]attaattcctgggtcaagactca aaccaaaggtaaatccaagaaaatattttatttacttctttccagttagaaaactctgatcTATC TTTTTCCATCCATGAACTTAG	281
PAI2u2	PAI2	A	G	L	L	cds	GE315	AAAACTATTAC CATGGCTTAAG AACTA	TTGAATTGTAG AGAACTGCTTT GAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattcc ttcttttcttttcaaggcacaagctgcagataaaatccattcatccttccgctctctcagctctgc aatcaatgcatccacagggaattattt[a/g]ctggaaagtgtcaataagctgtttggtgagaag tctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatg aagtcactTTCAAAGCAGTTCTCTACAATTCAA	293

FIG. 5MMMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2u3	PAI2	T	G	P	P	cds	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgatttttaatattagacttaaag ttgttttccttctttctaatacttgctgtaatttttcttttgtttgttttgttttgttttgctttg cagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctga agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattc tgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggag aggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcac tgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttg tggcagatcatcc[t/g]tttctttttcttattatgcataagataaccaactgcattttatttttt cggcagattttcctcaccctaaaactaagcgtgctgcttctgcaaaagatttttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2u4	PAI2	C	G	N	K	cds	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgatttttaatattagacttaaag ttgttttccttctttctaatacttgctgtaatttttcttttgtttgttttgttttgttttgctttg cagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctga agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattc tgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggag aggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcac tgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttg tggcagatcatccttttcttttttcttattatgcataagataaccaa[c/g]tgcattttatttttt cggcagattttcctcaccctaaaactaagcgtgctgcttctgcaaaagatttttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2u5	PAI2	C	G	S	C	cds	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgatttttaatattagacttaaag ttgttttccttctttctaatacttgctgtaatttttcttttgtttgttttgttttgttttgctttg cagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctga agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattc tgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggag aggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcac tgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttg tggcagatcatccttttcttttttcttattatgcataagataaccaactgcattttatttttcggc agatttt[c/g]ctcaccctaaaactaagcgtgctgcttctgcaaaagatttttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2u6	PAI2	C	G	V	V	cds	GE312	GGGAAGACCAT AATTCACCATT	CTAAGTTCATG GATGGAAAAAG ATA	GGGAAGACCATAATTCACCATTatgccatggcttgtttggtatgtattttatgtagcctttgtca ttttcttgctttaaaggaatatattcgactctgtcagaaatattactcctcagaaccccaggcag tagacttcctagaatgtgcagaagaagctagaaaaaagattaattcctgggt[c/g]aagactca aaccaaaggtaaatccaagaaaatattttatttacttctttccagttagaaaactctgatcTATC TTTTTCCATCCATGAACTTAG	281

FIG. 5NNNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2u7	PAI2	A	C	E	A	cds	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgatttttaatattagacttaaag ttgttttccttctttctaatacttgctgtaattttcttttgtttgttttgttttgttttgctttg cagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctg[a/c]agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatcc attctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtc ggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagg gcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacag tttgtggcagatcatccttttctttttcttattatgcataagataaccaactgcattttatttt cggcagattttcctcaccctaaaactaagcgtgctgcttctgcaaaagatttttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTCTGCT CTTCTGAACAACTTC	665
PAI2u8	PAI2	T	C	N	N	cds	GE315	AAAACTATTAC CATGGCTTAAG AACTA	TTGAATTGTAG AGAACTGCTTT GAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattcc ttctttcttttcaaggcacaagctgcagataaaatccattcatccttccgctctctcagctctgc aatcaatgcatccacagggaa[t/c]tatttactggaaagtgtcaataagctgtttggtgagaag tctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatg aagtcactTTCAAAGCAGTTCTCTACAATTCAA	293
PAI2u9	PAI2	C	T	D	D	cds	GE312	GGGAAGACCAT AATTCACCATT	CTAAGTTCATG GATGGAAAAAG ATA	GGGAAGACCATAATTCACCATTatgccatggcttgtttggtatgtattttatgtagcctttgtca ttttcttgctttaaaggaatatattcgactctgtcagaaatattactcctcagaaccccaggcag taga[c/t]ttcctagaatgtgcagaagaagctagaaaaaagattaattcctgggtcaagactca aaccaaaggtaaatccaagaaaatattttatttacttctttccagttagaaaactctgatcTATC TTTTTCCATCCATGAACTTAG	281
PC1d11	PC1	C	T	S	S	cds	GE1203	CCCTCCAGCCC AAATCT	GGAGATACTTA CCTGGGCT	CCCTCCAGCCCAAATCTcacctggcgagatatgcagcacctggttgtctggacctctgagtatga cccgctggccaataaccctggatggaaaaagaatggagcaggcttgatggtgaatagtcgatttg gatttggcttgctaaatgccaaagctctggtggatttagctgaccccaggacctggaggag[c/t]gtgcctgagaagaaagagtgtgttgtaaaggacaatgactttgAGCCCAGGTAAGTATCTCC	258
PC1u1	PC1	T	C	-	-	noncoding	GE1212	CTTCACTGAGC GCTCGCC	ACCTGACCCAA AAGGTCAT	CTTCACTGAGCGCTCGCCgccgcccagcctctcctctcgcgcctcctagctcttcgcagagcaac caggagccaggagtggtc[t/c]agagcccgagggtgggaaggggagtctgtctggctttctc ctatcttgcttctttttcctcttcccttcccactcttgttcaagcgagtgtgtgagctatggagc gaagagcctggagtctgcagtgcactgctttcgtcctcttttgcgcttggtgtgcactgaacagt gcaaaagcgaaaaggcaatttgtcaatgaatgggcagcggagatccccgggggcccggaagcagc ctcggccatcgccgaggagctgggctATGACCTTTTGGGTCAGGT	370
PC1u10	PC1	T	A	P	P	cds	GE543	AACTTGTATTT GTTTCATAGGA ACT	TTTTTCATCCT CTCATTTACAC	AACTTGTATTTGTTTCATAGGAACTagcactgtgctcttggctgaaagagaacgggatacatctc c[t/a]aatggctttaagaattgggacttcatgtctgttcacacatggggagagaaccctatagg tacttggactttgagaattacagacatggtaaGTGTAAATGAGAGGATGAAAAA	184
PC1u2	PC1	C	T	N	N	cds	GE515	TGTCTCTTTAG GATCCAGAGGC	ACACAAATGCA TATTTACTCAC T	TGTCTCTTTAGGATCCAGAGGCtagctatgattttaatgataatgaccatgatccatttccccga tatgatcccacaaa[c/t]gagaacaAGTGAGTAAATATGCATTTGTGT	114
PC1u3	PC1	A	G	N	D	cds	GE504	CTTATTTTTCA ATCCTCAGACA	TAGGGACAATC CTCTGTTTT	CTTATTTTTCAATCCTCAGACAcgggaccagatgtgcaggagaaattgccatgcaagca[a/g]a taatcacaaatgcggggttggagttgcatacaattccaaagttggaggtAAAACAGAGGATTGTC CCTA	134
PC1u4	PC1	T	C	N	N	cds	GE543	AACTTGTATTT GTTTCATAGGA ACT	TTTTTCATCCT CTCATTTACAC	AACTTGTATTTGTTTCATAGGAACTagcactgtgctcttggctgaaagagaacgggatacatctc ctaatggctttaagaa[t/c]tgggacttcatgtctgttcacacatggggagagaaccctatagg tacttggactttgagaattacagacatggtaaGTGTAAATGAGAGGATGAAAAA	184

FIG. 5000000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PC1u5	PC1	C	G	Q	E	cds	GE1236	TAGGAGCAGCC CACACA	CACTTGTGCAG ACAGGAA	TAGGAGCAGCCCACACAagagaaccctaaggagaacaccctggtgtccaaaagccccagcagcag cagcgtagggggccggagggatgagttggaggagggagccccttcc[c/g]aggccatgctgcga ctcctgcaaagtgctttcagtaaaaactcaccgccaaagcaatcaccaaagaagtccccaagtgc aaagctcaacatcccttatgaaaacttctacgaagccctggaaaagctgaacaaaccttcccagc ttaaagactctgaagacagtctgtataatgactatgttgatgtttttttataacactaaaccttac aagcacagagacgaccggctgcttcaagctctggtggacattctgaatgaggaaaattaaaataa gtgtgtggtcccaagttggaaatattcatgcttcttccttaccctgcgattttgcctgtgtctga agtggttgttttgtcatgaattcttatgcttataatatcctttgtggcacctttttcttttttctcc ctaaactgtacatgtgaaggggatgagctcaagcaggaagttcaacttccagaattgatcatagg tatttcaaaacacatcttTTCCTGTCTGCACAAGTG	620
PC1u6	PC1	G	C	S	T	cds	GE1236	TAGGAGCAGCC CACACA	CACTTGTGCAG ACAGGAA	TAGGAGCAGCCCACACAagagaaccctaaggagaacaccctggtgtccaaaagccccagcagcag cagcgtagggggccggagggatgagttggaggagggagccccttcccaggccatgctgcgactcc tgcaaagtgctttcagtaaaaactcaccgccaaagcaatcaccaaagaagtccccaa[g/c]tgc aaagctcaacatcccttatgaaaacttctacgaagccctggaaaagctgaacaaaccttcccagc ttaaagactctgaagacagtctgtataatgactatgttgatgtttttttataacactaaaccttac aagcacagagacgaccggctgcttcaagctctggtggacattctgaatgaggaaaattaaaataa gtgtgtggtcccaagttggaaatattcatgcttcttccttaccctgcgattttgcctgtgtctga agtggttgttttgtcatgaattcttatgcttataatatcctttgtggcacctttttcttttttctcc ctaaactgtacatgtgaaggggatgagctcaagcaggaagttcaacttccagaattgatcatagg tatttcaaaacacatcttTTCCTGTCTGCACAAGTG	620
PC1u7	PC1	T	G	C	G	cds	GE1233	TTTAGAGCCCT GAAAGCTA	GAAGTAAGTGT GACATGAAGGT	TTTAGAGCCCTGAAAGCTAatggagaagttatcattgaaattccaacaagagct[t/g]gtgaag gacaagaaaatgctatcaagtccctggagcatgtacaatttgaagcaacaattgaatattcccga agaggagACCTTCATGTCACACTTACTTC	159
PC1u8	PC1	T	G	I	S	cds	GE1212	CTTCACTGAGC GCTCGCC	ACCTGACCCAA AAGGTCAT	CTTCACTGAGCGCTCGCCgccgcccagcctctcctctcgcgcctcctagctcttcgcagagcaac caggagccaggagtggtctagagcccgagggtgggaaggggagtctgtctggcttttctcctat cttgcttcttttttcctcttccctcccactcttgttcaagcgagtgtgtgagctatggagcgaag agcctggagtctgcagtgcactgctttcgtcctcttttgcgcttggtgtgcactgaacagtgcaa aagcgaaaaggcaatttgtcaatgaatgggcagcggagatccccgggggcccggaagcagcctcg gcca[t/g]cgccgaggagctgggctATGACCTTTTGGGTCAGGT	370
PC1u9	PC1	G	A	L	L	cds	GE1236	TAGGAGCAGCC CACACA	CACTTGTGCAG ACAGGAA	TAGGAGCAGCCCACACAagagaaccctaaggagaacaccct[g/a]gtgtccaaaagccccagca gcagcagcgtagggggccggagggatgagttggaggagggagccccttcccaggccatgctgcga ctcctgcaaagtgctttcagtaaaaactcaccgccaaagcaatcaccaaagaagtccccaagtgc aaagctcaacatcccttatgaaaacttctacgaagccctggaaaagctgaacaaaccttcccagc ttaaagactctgaagacagtctgtataatgactatgttgatgtttttttataacactaaaccttac aagcacagagacgaccggctgcttcaagctctggtggacattctgaatgaggaaaattaaaataa gtgtgtggtcccaagttggaaatattcatgcttcttccttaccctgcgattttgcctgtgtctga agtggttgttttgtcatgaattcttatgcttataatatcctttgtggcacctttttcttttttctcc ctaaactgtacatgtgaaggggatgagctcaagcaggaagttcaacttccagaattgatcatagg tatttcaaaacacatcttTTCCTGTCTGCACAAGTG	620
PCId11	PCI	T	G	-	-	noncoding	GE334	TATGAATCCAA GGGGTGAGG	GGAATGAAATG GGGTAGAGTAG A	TATGAATCCAAGGGGTGAGGctcagtgtgccaatgccccagaacagtctaagaaagctccttttc cctttccaggcagctcgagctttaccttcccaaattctccattgagggctcctatcagctggaga aagtcctccccagtctggggatcagtaacgtcttcacctcccatgctgatctgtcccgcatcagc aaccactcaaatatccaggtgtctgaggtgggttcagaagctcctatgcatctgcttcccaagat ctattctgttctattctttcta[t/g]TCTACTCTACCCCATTTCATTCC	310

FIG. 5PPPPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCId12	PCI	A	G	-	-	noncoding	GE334	TATGAATCCAA GGGGTGAGG	GGAATGAAATG GGGTAGAGTAG A	TATGAATCCAAGGGGTGAGGctcagtgtgccaatgccccagaacagtctaagaaagctccttttc cctttccaggcagctcgagctttaccttcccaaattctccattgagggctcctatcagctggaga aagtcctccccagtctggggatcagtaacgtcttcacctcccatgctgatctgtcccgcatcagc aaccactcaaatatccaggtgtctgaggtgggttcagaagctcctatgcatctgcttcccaag[a /g]tctattctgttctattctttctatTCTACTCTACCCCATTTCATTCC	310
PCId13	PCI	T	A	-	-	noncoding	GE375	GAAGCTTTGCC ATTTGCTATG	GTGTGGGTGGA AGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctc ccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagcc acggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaacaggcc ctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtg ggcttctcctgaaatctacaggcctcagggtgggagatgaaggggctа[t/a]gctatggccc atctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataa tattactctatggaTGATTGCTTCCACCCACAC	423
PCId14	PCI	T	G	V	G	cds	GE375	GAAGCTTTGCC ATTTGCTATG	GTGTGGGTGGA AGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctc ccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagcc acggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctag[t/g]gttcaaca ggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctga ggtggggcttctcctgaaatctacaggcctcagggtgggagatgaaggggctatgctatggccc atctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataa tattactctatggaTGATTGCTTCCACCCACAC	423
PCId15	PCI	G	A	-	-	noncoding	GE375	GAAGCTTTGCC ATTTGCTATG	GTGTGGGTGGA AGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccct[g/a]gtggcctggtgatgcctggtg tctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggc agccacggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaaca ggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctga ggtggggcttctcctgaaatctacaggcctcagggtgggagatgaaggggctatgctatggccc atctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataa tattactctatggaTGATTGCTTCCACCCACAC	423
PCId16	PCI	C	T	-	-	noncoding	GE375	GAAGCTTTGCC ATTTGCTATG	GTGTGGGTGGA AGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctc ccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagcc acggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaacaggcc ctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtg ggcttctcctgaaatctacaggcctcagggtgggagatgaaggggctatgctatggcccatct gtatgctggtagctagtgatttacgacaggtttagttgactagatgagg[c/t]attacaaataa tattactctatggaTGATTGCTTCCACCCACAC	423

FIG. 5QQQQQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCId17	PCI	C	T	N	N	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc aggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttaccttgacctctacagggccttggcttc cgctgcccccagccagaa[c/t]atcttcttctcccctgtgagcatctccatgagcctggccatg ctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctcca gaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgcccttttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCId18	PCI	C	T	P	P	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc aggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttaccttgacctctacagggccttggcttc cgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatgctct ccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaa agctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagcccagaga tggcttccagctgagcctcggcaatgcccttttcaccgacctggtggtagacctgcaggacacct tcgtaagtgccatgaagacgctgtacctggcagacactttccc[c/t]accaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCIu1	PCI	T	C	F	F	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc aggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttaccttt[t/c]gacctctacagggccttgg cttccgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatg ctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctcca gaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgcccttttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787

FIG. 5RRRRRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCIu10	PCI	G	C	G	R	cds	GE394	TGGCTATCTTT ACTGTCTTCAC TCC	GTCCTTCCCAC CAGTGCTGT	TGGCTATCTTTACTGTCTTCACTCCttttatttgcagctgagaatttctaattctgacacaaaat tcttttttcatttttccctttttttcatctttagctaagtgggagacaagcttcaaccacaaa[g/c]gcacccaagagcaagacttctacgtgacctcggagactgtggtgcgggtacccatgatgagccg cgaggatcagtatcactacctcctggaccggaacctctcctgcagggtggtgggggtcccctacc aaggcaatgccacggctttgttcattctccccagtgagggaaagatgcagcaggtggagaatgga ctgagtgagaaaacgctgaggaagtggcttaagatgttcaaaaagaggtactttcagactacccc agggccagcctaaacccacacagccccagggagacacacacgccctaccagggccacACAGCACT GGTGGGAAGGAC	467
PCIu2	PCI	A	G	N	S	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc aggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttc cgctgcccccagccaga[a/g]catcttcttctccccctgtgagcatctccatgagcctggccatg ctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctcca gaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCIu3	PCI	C	A	I	I	cds	GE375	GAAGCTTTGCC ATTTGCTATG	GTGTGGGTGGA AGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctc ccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagcc acggggacaat[c/a]ttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaaca ggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctga ggtggggcttctcctgaaatctacaggcctcagggtgggagatgaaggggctatgctatggccc atctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataa tattactctatggaTGATTGCTTCCACCCACAC	423
PCIu4	PCI	G	A	S	S	cds	GE375	GAAGCTTTGCC ATTTGCTATG	GTGTGGGTGGA AGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctc ccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagcc acggggacaatcttcactttcaggtc[g/a]gcccgcctgaactctcagaggctagtgttcaaca ggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctga ggtggggcttctcctgaaatctacaggcctcagggtgggagatgaaggggctatgctatggccc atctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataa tattactctatggaTGATTGCTTCCACCCACAC	423

FIG. 5SSSSSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence
PCIu5	PCI	C	T	A	V	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	787 cctggaccagctccaccctctctgaggacaccttctttccct atgcagctcttcctctcttgtgcctggtgctttctcagccctc ccacccccgggagatgaagagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagcagcagcagcagcag ctccgctgcccccagccagaacatcttctttctccccctgtg gaaaagctcagaggaaggagctgcacaaaagaaatgcaaaa gagatggcttccagctgagccctcggcaatgcctcgcctcc acttcgtaagtgccatgaagcagatcaatgatattatgtggc tgcttaagaacctcgatagcaatgcggtaaggtcgtgatca gccctgggcccaaacctgcactttctatctgtggcaaagcaa tcccTCA
PCIu6	PCI	A	G	K	E	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	787 GGACATCTCTGGAAAGTCAGCacctgaccagctccaccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcatgcagctcttcctctcttgtgcctggtgctttctcagccctc aggggcctcccttcaccgccaccaccaccacccccgggagatgaagagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagcagcagcagcagcag ctccgctgcccccagccagaacatcttctttctccccctgtg gaaaagctcagaggaaggagctgcacaaaagaaatgcaaaa gagatggcttccagctgagccctcggcaatgcctcgcctcc acttcgtaagtgccatgaagcagatcaatgatattatgtggc tgcttaagaacctcgatagcaatgcggtaaggtcgtgatca gccctgggcccaaacctgcactttctatctgtggcaaagcaa tcccTCA
PCIu7	PCI	T	A	F	I	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	787 GGACATCTCTGGAAAGTCAGCacctgaccagctccaccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcatgcagctcttcctctcttgtgcctggtgctttctcagccctc aggggcctcccttcaccgccaccaccaccacccccgggagatgaagagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagcagcagcagcagcag ctccgctgcccccagccagaacatcttctttctccccctgtg gaaaagctcagaggaaggagctgcacaaaagaaatgcaaaa gagatggcttccagctgagccctcggcaatgcctcgcctcc acttcgtaagtgccatgaagcagatcaatgatattatgtggc tgcttaagaacctcgatagcaatgcggtaaggtcgtgatca gccctgggcccaaacctgcactttctatctgtggcaaagcaa tcccTCA

FIG. 5TTTTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCIu8	PCI	C	G	A	G	cds	GE394	TGGCTATCTTT ACTGTCTTCAC TCC	GTCCTTCCCAC CAGTGCTGT	TGGCTATCTTTACTGTCTTCACTCCttttatttgcagctgagaatttctaattctgacacaaaat tctttttcatttttccctttttcatctttag[c/g]taagtgggagacaagcttcaaccacaaa ggcacccaagagcaagacttctacgtgacctcggagactgtggtgcgggtacccatgatgagccg cgaggatcagtatcactacctcctggaccggaacctctcctgcagggtggtgggggtcccctacc aaggcaatgccacggctttgttcattctccccagtgagggaaagatgcagcaggtggagaatgga ctgagtgagaaaacgctgaggaagtggcttaagatgttcaaaaagaggtactttcagactacccc agggccagcctaaacccacacagccccagggagacacacacgccctaccagggccacACAGCACT GGTGGGAAGGAC	467
PCIu9	PCI	C	G	P	A	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc aggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttc cgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatgctct ccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaa agctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccag[c/g]cca gagatggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PRLd5	PRL	G	A	-	-	noncoding	GE523	ACTTCCAGATC TTCTCTGGTG	CCCCACAGGAG TGTTGATACA	ACTTCCAGATCTTCTCTGGTGaagtgtgtttcctgcaacgatcacaaacatgaacatcaaaggat cgccatggaaaggtatgtgtgacaactcactgcgttgttg[g/a]tTGTATCAACACTCCTGTGG GG	132
PRLd6	PRL	C	T	R	*	cds	GE600	CCCCATTGTAT TTTACCTATTT T	TCACCGCTTAT ATTAATGAGAA AAAC	CCCCATTGTATTTTACCTATTTTaatgcaattgttctatatggtttcgtagcaaaaagactttct gagcctgatagtcagcatattg[c/t]gatcctggaatgagcctctgtatcatctggtcacggaa gtacgtggtatgcaagaagccccggaggctatcctatccaaagctgtagagattgaggagcaaac caaacggcttctagagggcatggagctgatagtcagccaggtgagcagcctcttggtgcttcttt GTTTTTCTCATTAATATAAGCGGTGA	286
PRLu1	PRL	A	C	N	H	cds	GE631	ACAGTTAGAAA GAACAAGGACA	GATCATTAAGG ACCTTCTCAG	ACAGTTAGAAAGAACAAGGACAtacaaatactaataatatgaagaataagtcactctttttttgt gtgattaggttcatcctgaaaccaaagaaaatgagatctaccctgtctggtcgggacttccatcc ctgcagatggctgatgaagagtctcgcctttctgcttattataacctgctccactgcctacgcag ggattcacataaaatcgacaattatctcaagctcctgaagtgccgaatcatccacaac[a/c]ac aactgctaagcccacatccatttcatctatttCTGAGAAGGTCCTTAATGATC	313
PRLu2	PRL	A	T	K	N	cds	GE600	CCCCATTGTAT TTTACCTATTT T	TCACCGCTTAT ATTAATGAGAA AAAC	CCCCATTGTATTTTACCTATTTTaatgcaattgttctatatggtttcgtagcaaaa[a/t]gact ttctgagcctgatagtcagcatattgcgatcctggaatgagcctctgtatcatctggtcacggaa gtacgtggtatgcaagaagccccggaggctatcctatccaaagctgtagagattgaggagcaaac caaacggcttctagagggcatggagctgatagtcagccaggtgagcagcctcttggtgcttcttt GTTTTTCTCATTAATATAAGCGGTGA	286
PRLu3	PRL	G	A	E	E	cds	GE631	ACAGTTAGAAA GAACAAGGACA	GATCATTAAGG ACCTTCTCAG	ACAGTTAGAAAGAACAAGGACAtacaaatactaataatatgaagaataagtcactctttttttgt gtgattaggttcatcctgaaaccaaagaaaatgagatctaccctgtctggtcgggacttccatcc ctgcagatggctgatgaaga[g/a]tctcgcctttctgcttattataacctgctccactgcctac gcagggattcacataaaatcgacaattatctcaagctcctgaagtgccgaatcatccacaacaac aactgctaagcccacatccatttcatctatttCTGAGAAGGTCCTTAATGATC	313

FIG. 5UUUUUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PRLu4	PRL	G	A	V	V	cds	GE613	TCCGTGGAATA AATCATCTCAG	CAGTAGTTCAT GTGAAGGCTCC	TCCGTGGAATAAATCATCTCAGagtggctcgcgttcctgctg ctggtgtcaaacctgctgctgtgccagagcgt[g/a]gc ctgcccgatgccaggtgacccttcgagacctgtttgacc cataacctctcctcagaaatgttcagcgaattcgtaagt GGAGCCTTCACATGAACTACTG	282
PROS1u 1	PROS1	A	T	K	M	cds	GE935	TATAAACTGAT TGTTTCCTTCA G	GGAAATGTTCA GTCTGTAGTTG TATGTC	TATAAACTGATTGTTTCCTTCAGtttgtcaa[a/t]gc aagcgtcgtgcaaattctttacttgaagaaaccaaacag agaactgtgcaataaagaagaagccagggaggtctttga atggaaactatcaagttcacacatctaGACATACAACTA	250
PROS1u 10	PROS1	A	G	R	R	cds	GE280	CCTGCTCTTCA GGATATTCTGT TAT	TGGAAGGCCAC CCAGGTAT	CCTGCTCTTCAGGATATTCTGTTATctgttgaaaatact tctatgttccgatcaacaatcttcatcttggaatttagagt tcgacaccacttaaaatagaaaccatctcccatgaagac caaagcaatgaaagcaaaagtggccacATACCTGGGTGG	241
PROS1u 11	PROS1	A	T	T	S	cds	GE277	CACACAATTTT ATTTTTCCATG AC	TGCAGAGAACT TTTCAGGAGA	CACACAATTTTATTTTTCCATGACatgagataaaaaaaa attccagaccagtgtagtccctgccatgcaatgaagat agcttctttt[a/t]cttgcacttgtaaaccaggttggc tataataccccccgcccccccagctcatcaggattggTCT	252
PROS1u 2	PROS1	T	A	C	*	cds	GE277	CACACAATTTT ATTTTTCCATG AC	TGCAGAGAACT TTTCAGGAGA	CACACAATTTTATTTTTCCATGACatgagataaaaaaaa attccagaccagtgtagtccctgccatgcaatgaagat agcttctttt[a/t]cttgcacttgtaaaccaggttggc tataataccccccgcccccccagctcatcaggattggTCT	252
PROS1u 3	PROS1	T	C	C	R	cds	GE262	ATAAGATTGAA CATTTAGGGGA TATTA	CATTTTAGAAA ACAGGTGAGAA GTTA	ATAAGATTGAACATTTAGGGGATATTAaagtttgtgtgc atgaa[t/c]gctctgagaacatgtgctcagctttgtgtca ctattgtgatgggaagaaaggattcaaacttgcccaaga tacatttatGTTTCAATAACAGCTGAAGGGTTT	230
PROS1u 4	PROS1	A	G	P	P	cds	GE317	AAACAAGATGC TAAAAGTCTTG GA	AAACCCTTCAG CTGTTATTGAA AC	AAACAAGATGCTAAAAGTCTTGGACtaatattcttaatc tgccacaccagtgaatgcctttttataatggctgcatgga atctggatgaagccattcttaaggcatctttttctctgct gaaaaagacaaagaattcttaaggcatctttttctctgct tatacttatGTTTCAATAACAGCTGAAGGGTTT	293
PROS1u 5	PROS1	T	C	Y	Y	cds	GE262	ATAAGATTGAA CATTTAGGGGA TATTA	CATTTTAGAAA ACAGGTGAGAA GTTA	ATAAGATTGAACATTTAGGGGATATTAaagtttgtgtgc atgaatgctctgagaacatgtgctcagctttgtgtca t/c]tgtgatgggaagaaaggattcaaacttgcccaaga tacaatgcttAACTTCTCACCTGTTTTCTAAAATG	230
PROS1u 6	PROS1	A	G	T	A	cds	GE918	TCGAGCCACTG TTTAAGTTT	AGATACTCAAT AATGTTTCACA AATAA	TCGAGCCACTGTTTAAGTTTaaaatgcactccttgactt cgtctagatggatgtatacgaagctggaatttgatgaag tattcaagaaaaacaaaataagcattgcctggtt[a/g] ggttctggaattgctcaatttcacatagattatagtaag cattaatgagtaaatttattcattaacaaacagtaataa CT	327

FIG. 5VVVVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PROS1u 7	PROS1	G	A	E	K	cds	GE918	TCGAGCCACTG TTTAAGTTT	AGATACTCAAT AATGTTTCACA AATAA	TCGAGCCACTGTTTAAGTTTaaaatgcactccttgacttgtattttaatttgttagattaaccct cgtctagatggatgtatacgaagctggaatttgatgaagcaaggagcttctggaataaag[g/a] aaattattcaagaaaaacaaaataagcattgcctggttactgtggagaagggctcctactatcct ggttctggaattgctcaatttcacatagattatagtaagtgattttccatttatctctatttttct cattaatgagtaaatttattcattaacaaacagtaataatTTATTTGTGAAACATTATTGAGTAT CT	327
PROS1u 8	PROS1	T	G	L	R	cds	GE280	CCTGCTCTTCA GGATATTCTGT TAT	TGGAAGGCCAC CCAGGTAT	CCTGCTCTTCAGGATATTCTGTTATctgttgaaaatactgtaatatatcggatacaggccctaag tctatgttccgatcaacaatctcatc[t/g]ggaatttagagtcaacagaaacaatctggagttg tcgacaccacttaaaatagaaaccatctcccatgaagaccttcaaagacaacttgccgtcttgga caaagcaatgaaagcaaaagtggccacATACCTGGGTGGCCTTCCA	241
PROS1u 9	PROS1	T	C	Y	Y	cds	GE277	CACACAATTTT ATTTTTCCATG AC	TGCAGAGAACT TTTCAGGAGA	CACACAATTTTATTTTTCCATGACatgagataaaaaaaaataaatagatgtctatttccttcagcc attccagaccagtgtagtcctctgccatgcaatgaagatggata[t/c]atgagctgcaaagatg gaaaagcttcttttacttgcacttgtaaaccaggttggcaaggagaaaagtgtgaatttggtacg tataataacccccgccccccagctcatcaggattggTCTCCTGAAAAGTTCTCTGCA	252
PTHd3	PTH	G	A	-	-	noncoding	GE1224	AAGCTTCTCGT GAAAACCAAC	AGAGAGGGCCA CTTCCCA	AAGCTTCTCGTGAAAACCAACCcaattagttagtattgcattctgtgtactatagtttggaatat taaaaatattttaaaatacctccattttgcttatccttttagtgaagatgatacctgcaaaagac atggctaaagttatgattgtcatgttggcaatttgttttcttacaaaatcggatgggaaatctgt taagtaagtactgttttgccttggaattggatttttaatgttgactttatcatttc[g/a]aagt ggggagctaaTGGGAAGTGGCCCTCTCT	288
PTHLHa 23	PTHLH	T	C	-	-	noncoding	GE651	GAAAACTAACC TGTTTTCTCCT TTTC	TTCCTTCTACT AAAAATCTTAA AGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttcttttttgcaggaggcattgaaattttc agcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaa atatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatga aactgcacattggtcattgtgaatatttttttttttgccaaggctaatccaattattattatcac atttaccataatttattttgtccattgatgtatttatttttgtaaatgtatcttggtgctgctgaa tttctatatttttttgtaacataatgcactttagatatacatatcaagtatgttgataaatgacac aatgaagtgtctctattttgtggttgattttaatgaatgcctaaatataattatccaaattgatt t[t/c]cctttgtgcatgtaaaaataacagtattttaaatttgtaaagaatgtctaataaaatat aatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHd 16	PTHLH	A	T	-	-	noncoding	GE1328	AGTAGTGCGGG GAGATGGAG	CAGCTTGGCAG CCCCTC	AGTAGTGCGGGGAGATGGAGagtcc[a/t]gactgacactcgggtcccattcccttctgttgcag gtcccgagcgcgagcggagacgatgcagcggagactggttcagcagtggagcgtcgcggtgttcc tgctgagctacgcggtgccctcctgcgggcgctcggtggagggtctcagccgccgcctgtaagtg ccccatcctccccagggcgccgggttggggaggccaggggGAGGGGCTGCCAAGCTG	252
PTHLHd 17	PTHLH	A	G	-	-	noncoding	GE634	GAGGAGGTAGA CAGACAGCTAT GTA	CTCCCAAGTTG AAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaa gggcctggttcgcaaagaagctgacttcagagggggaaactttcttcttttaggaggcggttagc cctgttccacgaacccaggagaactgctggccagattaattagacattgctatgggagacgtgta aacacact[a/g]cttatcattgatgcatatataaaaccattttatttcgctattatttcagag gaagcgcctctgatttgtttcttttttccctttttgctctttctggctgtgtggtttggagaaag cacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCT TTTCAACTTGGGAG	404

FIG. 5WWWWWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHd 18	PTHLH	T	C	-	-	noncoding	GE634	GAGGAGGTAGA CAGACAGCTAT GTA	CTCCCAAGTTG AAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaa gggcctggttcgcaaagaagctgacttcagaggggaaactttcttctttttaggaggcggttagc cctgttccacgaacccaggagaactgctggccagattaattagacattgctatgggagacgtgta aacacactacttatcattgatgcatatataaaaccatttttattttcgctattatttcagaggaag cgcctctgatttgtttctttttttcccttt[t/c]tgctctttctggctgtgtggtttggagaaag cacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCT TTTCAACTTGGGAG	404
PTHLHd 19	PTHLH	G	A	-	-	noncoding	GE669	GCAATTGACAG AGAATAACTCA GAATA	TGTCATTATTA CCTCAATCTGT G	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagca[g/a]tacccccctaccacac acacccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaa catcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatctt cataatttgctggagaagtgtatttcttcccccttactctcacacctgggcaaactttcttcagtg ttttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaa cactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatg tatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgcct taaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaa aatgtttaagtattaacttacaaggatataggttttttctcatgtattctttttgttcattggcaa gatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHd 20	PTHLH	C	T	-	-	noncoding	GE669	GCAATTGACAG AGAATAACTCA GAATA	TGTCATTATTA CCTCAATCTGT G	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacac ccctgtcctccagcaccatagaggcg[c/t]agagcccattcctctttctccaccgtcacccaa catcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatctt cataatttgctggagaagtgtatttcttcccccttactctcacacctgggcaaactttcttcagtg ttttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaa cactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatg tatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgcct taaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaa aatgtttaagtattaacttacaaggatataggttttttctcatgtattctttttgttcattggcaa gatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHd 21	PTHLH	G	A	-	-	noncoding	GE669	GCAATTGACAG AGAATAACTCA GAATA	TGTCATTATTA CCTCAATCTGT G	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacac ccctgtcctccagcaccatagaggcgctaga[g/a]cccattcctctttctccaccgtcacccaa catcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatctt cataatttgctggagaagtgtatttcttcccccttactctcacacctgggcaaactttcttcagtg ttttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaa cactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatg tatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgcct taaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaa aatgtttaagtattaacttacaaggatataggttttttctcatgtattctttttgttcattggcaa gatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683

FIG. 5XXXXXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHd22	PTHLH	T	C	-	-	noncoding	GE679	TTCTTTATCGATGCATTTCCATT	AGAAACATATCCCCCTAGATAGA	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttctttcactttcagtacagcacttctgtgggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatctcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggattataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaacccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaatgggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatctctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagataggatcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttatccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatatagtaaacattcaataaattgcaacatattatttggtgtttttagacctagttctgattgtatcctctacctatcatctatc[t/c]atttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu1	PTHLH	T	C	-	-	noncoding	GE634	GAGGAGGTAGACAGACAGCTATGTA	CTCCCAAGTTGAAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaagggcc[t/c]ggttcgcaaagaagctgacttcagaggggggaaactttcttcttttaggaggcggttagccctgttccacgaacccaggagaactgctggccagattaattagacattgctatgggagacgtgtaaacacactacttatcattgatgcatatataaaaccatttatttttcgctattatttcagaggaagcgcctctgatttgtttcttttttcccttttgctctttctggctgtgtggtttggagaaagcacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCTTTTCAACTTGGGAG	404
PTHLHu10	PTHLH	C	G	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacaccccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgtatttcttcccctactctcacacctgggcaaactttcttcagtgtttttcatttctta[c/g]gttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatgtatttaattaaatctcaaatttatttaatgtaaagaacttaaattatgttttaaacacatgccttaaatttgttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattcttttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHu11	PTHLH	T	G	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacaccccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgtatttcttcccctactctcacacctgggcaaactttcttcagtgtttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatgtatttaattaaatctcaaatttatttaatgtaaagaacttaaattatgttttaaacacatgccttaaatttg[t/g]ttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattcttttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683

FIG. 5YYYYYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHu 12	PTHLH	A	G	-	-	noncoding	GE669	GCAATTGACAG AGAATAACTCA GAATA	TGTCATTATTA CCTCAATCTGT G	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacac ccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatc aatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcata atttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttt tcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacact gcagaacagcatcatgtcataaacgattctgagccattcacacttttatttaattaaatgtatt taattaaatctcaaatttatttaatgtaaagaacttaaattatgttttaaacacatgccttaaa tttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatg tttaagtattaacttacaaggatataggttttttctcatgtattctttttgttcattggcaagatg aaataatttttctagggta[a/g]tgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHu 13	PTHLH	T	C	-	-	noncoding	GE679	TTCTTTATCGA TGCATTTCCAT T	AGAAACATATC CCCCTAGATAG A	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttctttcactttcagtacagcacttct gtggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatctcat tatttaagagtcccctgttacttctttagtcatttcc[t/c]ttgactctgctacagataggatt ataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaa cccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaat gggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatc tctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagatagg atcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttat ccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatat agtaaacattcaataaattgcaacatattatttggtgtttttagacctagttctgattgtatcc tctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu 14	PTHLH	G	T	-	-	noncoding	GE651	GAAAACTAACC TGTTTTCTCCT TTTC	TTCCTTCTACT AAAAATCTTAA AGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttctttttgcaggaggcattgaaattttc agcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaa atatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatga aactgcacattggtcattgtgaatatttttttttttgccaaggctaatccaattattattatcac atttaccataatttatttgtccattgatgtatttatttgtaaatgtatcttg[g/t]tgctgc tgaatttctatatttttgtaacataatgcactttagatatacatatcaagtatgttgataaatg acacaatgaagtgtctctattttgtggttgattttaatgaatgcctaaatataattatccaaatt gattttcctttgtgcatgtaaaaataacagtattttaaatttgtaaagaatgtctaataaaatat aatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHu 15	PTHLH	C	A	Y	*	cds	GE679	TTCTTTATCGA TGCATTTCCAT T	AGAAACATATC CCCCTAGATAG A	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttctttcactttcagta[c/a]agcac ttctgtggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatc tcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggatt ataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaa cccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaat gggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatc tctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagatagg atcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttat ccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatat agtaaacattcaataaattgcaacatattatttggtgtttttagacctagttctgattgtatcc tctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706

FIG. 5ZZZZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHu 2	PTHLH	A	T	-	-	noncoding	GE679	TTCTTTATCGATGCATTTCCATT	AGAAACATATCCCCCTAGATAGA	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttctttcactttcagtacagcacttctgtggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatctcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggattataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaacccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaatgggcagtggcactagaa[a/t]aatcttgagcacagtgaatgacctatcctgcaaacatctaatggatcctctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagataggatcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttatccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatatagtaaacattcaataaattgcaacatattattttggtgtttttagacctagttctgattgtatcctctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu 3	PTHLH	T	G	-	-	noncoding	GE651	GAAAACTAACCTGTTTTCTCCTTTTC	TTCCTTCTACTAAAAATCTTAAAGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttctttttgcaggaggcattgaaattttcagcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaaatatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatgaaactgcacattggtcattgtgaatatttttttttttgccaaggctaatccaattattattatcacatttaccataatttatttgtccattgatgtatttatttttgtaaatgtatcttgg[t/g]gctgctgaatttctatatttttttgtaacataatgcactttagatatacatatcaagtatgttgataaatgacacaatgaagtgtctctatttttgtggttgattttaatgaatgcctaaatataattatccaaatttgattttcctttgtgcatgtaaaaataacagtattttaaatttgtaaagaatgtctaataaaatataatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHu 4	PTHLH	A	G	-	-	noncoding	GE651	GAAAACTAACCTGTTTTCTCCTTTC	TTCCTTCTACTAAAAATCTTAAAGGATAG	GAAAACTAACCTGTTTTCTCCTTTCtttctcttccttctttttgcaggaggcattgaaattttcagcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaaatatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatgaaactgcacattggtcattgtgaatatttttttttttgccaaggctaatccaattattattatcacatttaccataatttatttgtccattgatgtatttatttttgtaaatgtatcttggtgctgctgaatttctatatttttttgtaacataatgcactttagatatacatatcaagtatgttgataaatgacacaatgaagtgtctctatttttgtggttgattttaatgaatgcctaaatataattatccaaattgatttttcctttgtgcatgtaaaaata[a/g]cagtattttaaatttgtaaagaatgtctaataaaatataatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHu 5	PTHLH	C	G	L	L	cds	GE1328	AGTAGTGCGGGGAGATGGAG	CAGCTTGGCAGCCCCTC	AGTAGTGCGGGGAGATGGAGagtccagactgacactcgggtcccattcccttctgttgcaggtccgagcgcgagcggagacgatgcagcggagactggttcagcagtggagcgtcgcggtgttcctgctgagctacgcggtgccctcctgcgggcgctcggtggagggtct[c/g]agccgccgcctgtaagtgccccatcctccccagggcgccgggttggggaggccaggggGAGGGGCTGCCAAGCTG	252
PTHLHu 6	PTHLH	A	G	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacaccccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatcaatccctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgt[a/g]tttcttccccttactctcacacctgggcaaactttcttcagtgtttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatgtatttaattaaatctcaaatttatttttaatgtaaagaacttaaattatgttttaaacacatgcctaaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683

FIG. 5AAAAAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHu 7	PTHLH	A	G	K	R	cds	GE679	TTCTTTATCGA TGCATTTCCAT T	AGAAACATATC CCCCTAGATAG A	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttctttcactttcagtacagcacttct gtgggtttgaaaaaaaaaaggaaaacaacaga[a/g]gaacacatcatatgcaactaatgatc tcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggatt ataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaa cccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaat gggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatc tctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagatagg atcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttat ccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatat agtaaacattcaataaattgcaacatattatttggtgtttttagacctagttctgattgtatcc tctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu 8	PTHLH	T	A	-	-	noncoding	GE634	GAGGAGGTAGA CAGACAGCTAT GTA	CTCCCAAGTTG AAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaa gggcctggttcgcaaagaagctgacttcagagggggaaactttcttcttttaggaggcggttagc cctgttccacgaacccaggagaac[t/a]gctggccagattaattagacattgctatgggagacg tgtaaacacactacttatcattgatgcatatataaaaccattttatttcgctattatttcagag gaagcgcctctgatttgtttctttttttccctttttgctctttctggctgtgtggtttggagaaag cacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCT TTTCAACTTGGGAG	404
PTHLHu 9	PTHLH	G	A	E	K	cds	GE662	ATTGTCTCTAT CAGCAACTAAA AT	AGGGGTGTGTG TGGTAGGG	ATTGTCTCTATCAGCAACTAAAATttaactgttttcttcccctctaatattttctttcaaagcaa aagagctgtgtct[g/a]aacatcagctcctccatgacaaggggaagtccatccaagatttacgg cgacgattcttccttcaccatctgatcgcagaaatccacacagctgaaatcagagcgaccgcgga gggggccccgaacgccaagcccgcgcccaacacaaagaaccaccccgtccgatttgggtctgatg atgagggcagatacctaactcaggaaactaacaaggtggagacgtacaaagagcagccgctcaag acacctgggaagaaaaagaaaggcaagcccgggaaacgcaaggagcaggaaaagaaaaaacggcg aactcgctctgcctggttagactctggagtgactgggagtgggctagaaggggaccacctgtctg acacctccacaacgtcgctggagctcgattcacggtaacaggcttctctggcccgtagcctcagc ggggtgctctcagctgcctcccttctgccttggcttggacaaacctagaattttctccctttatg tatctctatcgattgtgtagcaattgacagagaataactcagaatattgtctgccttaaagcagt acccCCCTACCACACACACCCCT	673
PTHu1	PTH	A	G	-	-	noncoding	GE1224	AAGCTTCTCGT GAAAACCAAC	AGAGAGGGCCA CTTCCCA	AAGCTTCTCGTGAAAACCAACCcaattagttagtattgcattctgtgtactatagtttggaatat taaaaatattttaaaatacctccattttgctt[a/g]tccttttagtgaagatgatacctgcaaa agacatggctaaagttatgattgtcatgttggcaatttgttttcttacaaaatcggatgggaaat ctgttaagtaagtactgttttgccttggaattggatttttaatgttgactttatcatttcgaagt ggggagctaaTGGGAAGTGGCCCTCTCT	288
PTHu2	PTH	C	A	R	R	cds	GE1210	CATTTCGAAGT GGGGAGCTA	CATGTATTGTT GCCCTACACTG	CATTTCGAAGTGGGGAGCTAatgggaagtggccctctctgtttctcttcttcccaggaagagatc tgtgagtgaaatacagcttatgcataacctgggaaaacatctgaactcgatggagagagtagaat ggctgcgtaagaagctgcaggatgtgcacaattttgttgcccttggagctcctctagctcccaga gatgctggttcccagaggccc[c/a]gaaaaaaggaagacaatgtcttggttgagagccatgaaa aaagtcttggagaggcagacaaagctgatgtgaatgtattaactaaagctaaatcccagtgaaaa tgaaaacagatattgtcagagttctgctctagaCAGTGTAGGGCAACAATACATG	380
SELPd23	SELP	C	T	T	T	cds	GE452	CAGCTGTGAAA TGCTCAGA	AAAATTGTACC TTGGCAGG	CAGCTGTGAAATGCTCAGAactacatgttaataagccaatagcgatgaactgctccaacctctgg ggaaacttcagttatggatcaatctgctctttccattgtctagagggccagttacttaatggctc tgcacaaacagcatgccaagagaatggccactggtcaactac[c/t]gtgccaaCCTGCCAAGGT ACAATTTT	203

FIG. 5BBBBBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SELPd24	SELP	C	T	P	L	cds	GE954	TGCCCACCCCT GAAGAT	GGGCTGGGGCT GTCCAT	TGCCCACCCCTGAAGATtcctgaacgaggaaacatgatctgccttcattctgcaaaagcattcca gcatcagtctagctgcagcttcagttgtgaagagggatttgcattagttggac[c/t]ggaagtg gtgcaatgcacagcctcgggggtATGGACAGCCCCAGCCC	170
SELPd25	SELP	G	A	V	M	cds	GE446	CTCCTGCAGTG AGAGAGTG	CACTGTGGAGG CTTATTTG	CTCCTGCAGTGAGAGAGTGtggagaacttgagctccctcaacac[g/a]tgctcatgaactgcag ccaccctctgggaaacttctcttttaactcgcagtgcagcttccactgcactgacgggtaccaag taaatgggcccagcaagctggaatgcttggcttctggaatctggaCAAATAAGCCTCCACAGTG	194
SELPu1	SELP	A	C	N	T	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctgtcatttctcttgtaaca[a/c]tggctttaagct ggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu10	SELP	A	G	T	A	cds	GE466	TCTCTCCAGCT GTGCAGT	AAAATCCTACC CTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccagtgaagga[a/g]ccatggactgtgt tcatccgctcactgcttttgcctatggctccagctgcaaatttgagtgccagcccggctacagag tgaggggcttggacatgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGT GAGGGTAGGATTTT	209
SELPu11	SELP	T	C	T	T	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca c[t/c]cgtggagaattcaatgttggctccacctgtcatttctcttgtaacaatggctttaagct ggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu12	SELP	A	G	N	D	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctgtcatttctcttgt[a/g]acaatggctttaagct ggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu13	SELP	A	G	T	T	cds	GE421	TTTGTAGCAGG ACCATTGA	TCCTATTTACC TTTTTGTCTGA	TTTGTAGCAGGACCATTGActatccaggaagccctgacttactttggtggagcggtggcttctac [a/g]ataggtctgataatgggtgggacgctcctggctttgctaagaaagcgttTCAGACAAAAA GGTAAATAGGA	141
SELPu14	SELP	G	A	P	P	cds	GE483	AACCAGAAAGA AGTGGCAG	AAGGCCCTACC TGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatactcatggaatatttc ccgtaaatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaattgatt acctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaataag acatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgataatga acctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtcc[g/a]tcagcc cctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGC CTT	393
SELPu15	SELP	T	C	F	S	cds	GE466	TCTCTCCAGCT GTGCAGT	AAAATCCTACC CTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccagtgaaggaaccatggactgtgttcat ccgctcactgctt[t/c]tgcctatggctccagctgcaaatttgagtgccagcccggctacagag tgaggggcttggacatgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGT GAGGGTAGGATTTT	209
SELPu16	SELP	C	T	S	F	cds	GE445	ATCCCTTAGCT TTGCAGTG	ACACTCTTACC TTGGCATTC	ATCCCTTAGCTTTGCAGTGccaggatctcccagttccaaatgaggcccgggtgaactgctcccac cccttcggtgcctttaggtaccagtcagtctgcagcttcacctgcaatgaaggcttgctcctggt gggagcaagtgtgctacagtgcttggctactggaaactggaatt[c/t]tgttcctccaGAATGC CAAGGTAAGAGTGT	209

FIG. 5CCCCCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SELPu17	SELP	C	T	D	D	cds	GE454	TCCACTTAGCT ATTTCGTGTG	ACAGTACCTTG ACAGACTGGG	TCCACTTAGCTATTTCGTGTGagccgctggagagtcctgtccacggaagcatggattgctctcca tccttgagagcgtttcagtatga[c/t]accaactgtagcttccgctgtgctgaaggtttcatgc tgagaggagccgatatagttcggtgtgataacttgggacagtggacagcaccagcCCCAGTCTGT CAAGGTACTGT	206
SELPu18	SELP	A	T	S	C	cds	GE446	CTCCTGCAGTG AGAGAGTG	CACTGTGGAGG CTTATTTG	CTCCTGCAGTGAGAGAGTGtggagaacttgagctccctcaacacgtgctcatgaactgcagccac cctctgggaaacttctcttttaactcgcagtgcagcttccactgcactgacgggtaccaagtaaa tgggccc[a/t]gcaagctggaatgcttggcttctggaatctggaCAAATAAGCCTCCACAGTG	194
SELPu19	SELP	G	A	S	N	cds	GE466	TCTCTCCAGCT GTGCAGT	AAAATCCTACC CTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccа[g/a]tgaaggaaccatggactgtgt tcatccgctcactgcttttgcctatggctccagctgcaaatttgagtgccagcccggctacagag tgaggggcttggacatgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGT GAGGGTAGGATTTT	209
SELPu2	SELP	T	C	N	N	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctgtcatttctcttgtaacaa[t/c]ggctttaagct ggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu20	SELP	C	G	S	*	cds	GE483	AACCAGAAAGA AGTGGCAG	AAGGCCCTACC TGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatact[c/g]atggaata tttcccgtaaatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaatt gattacctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaa taagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgata atgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtccgtcagcc cctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGC CTT	393
SELPu21	SELP	T	A	N	K	cds	GE483	AACCAGAAAGA AGTGGCAG	AAGGCCCTACC TGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatactcatggaatatttc ccgtaaatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaattgatt acctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaa[t/a]aagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgata atgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtccgtcagcc cctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGC CTT	393
SELPu22	SELP	T	A	C	S	cds	GE451	TCACAACAGGC ATAGCAT	CCTCTGCATGC TGGAGTT	TCACAACAGGCATAGCATcacttcctactccagggttgcaatgtccagccctcaccactcctggg cagggaaccatgtactgtaggcatcatccgggaacctttggttttaataccacttgttactttgg ctgcaacgctggattcacactcataggagacagcactctcagc[t/a]gcagaccttcaggacaa tggacagcagtAACTCCAGCATGCAGAGG	224
SELPu3	SELP	T	A	N	K	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctgtcatttctcttgtaacaatggctttaagctggag gggcccaa[t/a]aatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu4	SELP	T	G	S	A	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctgtcatttctcttgtaacaatggctttaagctggag gggcccaataatgtggaatgcacaact[t/g]ctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208

FIG. 5DDDDDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SELPu5	SELP	T	G	L	V	cds	GE451	TCACAACAGGC ATAGCAT	CCTCTGCATGC TGGAGTT	TCACAACAGGCATAGCATcacttcctactccaggg[t/g]tgcaatgtccagccctcaccactcc tgggcagggaaccatgtactgtaggcatcatccgggaacctttggttttaataccacttgttact ttggctgcaacgctggattcacactcataggagacagcactctcagctgcagaccttcaggacaa tggacagcagtAACTCCAGCATGCAGAGG	224
SELPu6	SELP	A	G	M	V	cds	GE466	TCTCTCCAGCT GTGCAGT	AAAATCCTACC CTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccagtgaaggaaccatggactgtgttcat ccgctcactgcttttgcctatggctccagctgcaaatttgagtgccagcccggctacagagtgag gggcttggac[a/g]tgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGT GAGGGTAGGATTTT	209
SELPu7	SELP	T	C	C	C	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctg[t/c]catttctcttgtaacaatggctttaagct ggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu8	SELP	A	C	T	P	cds	GE452	CAGCTGTGAAA TGCTCAGA	AAAATTGTACC TTGGCAGG	CAGCTGTGAAATGCTCAGAactacatgttaataagccaatagcgatgaactgctccaacctctgg ggaaacttcagttatggatcaatctgctctttccattgtctagagggccagttacttaatggctc tgcacaaacagcatgccaagagaatggccactggtca[a/c]ctaccgtgccaaCCTGCCAAGGT ACAATTTT	203
SELPu9	SELP	A	T	K	*	cds	GE483	AACCAGAAAGA AGTGGCAG	AAGGCCCTACC TGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatactcatggaatatttc ccgt[a/t]aatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaatt gattacctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaa taagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgata atgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtccgtcagcc cctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGC CTT	393
SHBGd3	SHBG	T	C	-	-	noncoding	GE539	TGACATGTCCC TACTCAGCTTT	AACCAGGGGAC TGGGTC	TGACATGTCCCTACTCAGCTTTgtttg[t/c]tttctctttctgatagagtgcccacgaccctcc ggctgtccacctcagcaatggcccaggacaagagcctatcgctgtcatgacctttgacctcacca agatcacaaagtatggggttggcctagcccttGACCCAGTCCCCTGGTT	179
SHBGd4	SHBG	C	T	P	L	cds	GE603	GGCAGAAACAG ATCCCAGG	CCAGCAGTGCT TTACCAAGTC	GGCAGAAACAGATCCCAGGggcctctgattttgcttcccaccttcctgcaggtggaagtcaagat ggaggggactctgtgctgctggaggtggatggggaggaggtgctgcgcctgagacaggtctctg ggcccctgaccagcaaacgccatcccatcatgaggattgcgcttgggggctgctcttccccgct tccaaccttcggttgc[c/t]ggtaactacaccccaggggtggaaccctagccaaGACTTGGTAA AGCACTGCTGG	271
SHBGd5	SHBG	G	A	D	N	cds	GE605	CACCTTAATGC TCTAATGCCA	TTGCTAGTGCA CAGTGAATATT TG	CACCTTAATGCTCTAATGCCAcctttgcactacctccctctaggagaa[g/a]actcttccacct ctttttgcctgaatggcctttgggcacaaggtcagaggctggatgtggaccaggccctgaacaga agccatgagatctggactcacagctgccccagagcccaggcaatggcactgacgcttcccatta aagctccacctaagaacccccctttgaaagttactgattattcatttaattcaaCAAATATTCACT GTGCACTAGCAA	272
SHBGd6	SHBG	C	A	T	N	cds	GE605	CACCTTAATGC TCTAATGCCA	TTGCTAGTGCA CAGTGAATATT TG	CACCTTAATGCTCTAATGCCAcctttgcactacctccctctaggagaagactcttccacctcttt ttgcctgaatggcctttgggcacaaggtcagaggctggatgtggaccaggccctgaacagaagcc atgagatctgga[c/a]tcacagctgccccagagcccaggcaatggcactgacgcttcccatta aagctccacctaagaacccccctttgaaagttactgattattcatttaattcaaCAAATATTCACT GTGCACTAGCAA	272

FIG. 5EEEEEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SHBGu1	SHBG	G	A	R	H	cds	GE542	TCCCAAGAGTT GTCTGAGCC	AGGGAAGACTG CATGAGCTG	TCCCAAGAGTTGTCTGAGCCgccgagtggacagtggctgattatggagagcagaggcccactggc tacctcgcgcctgctgctgttgctgctgttgctactactgcgtcacaccc[g/a]ccagggatgg gccctgagacctgttctccccacccaggtgcaggagcgggacagggcactCAGCTCATGCAGTCT TCCCT	200
SHBGu2	SHBG	T	C	S	S	cds	GE1216	GAGTAGGCCCG GCTCAT	GTGCCGCCTCC CTTGAG	GAGTAGGCCCGGCTCATtcttccctctctctctaccgtccctttcccacacactctgcagaaggt ggtgttgtc[t/c]tctgggtcggggccagggctggatctgcccctggtcttgggactccctctt cagctgaagctgagtatgtccagggtggtcttgagccaagggtcgaagatgaaggcccttgccct gcctccctaggcctggctcccctccttaacctctgggccaagcctcaagggcgtctcttcctgg gggctttaccaggtaagagagaatgatgttcaagttcatgagcacaacattggaaacagCTCAAG GGAGGCGGCAC	336
SLC6A1 d9	SLC6A 1	C	T	-	-	noncoding	GE1097	AGGAGGAGGGG TCACCAGT	CCTGGTCTACA GTGAGGGTCA	AGGAGGAGGGGTCACCAGTcacccactttcctcccaggtggtctacttttcagccacataccccct acatcatngctgnatcatcctngttcttccgtggagtgacgctgcccggggccaaggagggcatc ctcttctacatcacacccaacttccgcaagctgtctgactccgaggtgagtgcccctcccagcc[c/t]ggattctgagccaccacttagcagctttgagataagcttttgcatctttnTGACCCTCACT GTAGACCAGG	270
SLC6A1 u1	SLC6A 1	G	A	-	-	noncoding	GE1037	CTGCCCCATCG CTGCTTC	CCAACCTGGTT AAGAGAGAGAA CT	CTGCCCCATCGCTGCTTCaccatccctcctctcctcccctttcttcgctttgcaggatctcaccca [g/a]ggtggcagaaggaggccttctggagctgacccacccccgacgaccatcaggtaacgtcaa cagccccggtaacaacatccatgagtggAGTTCTCTCTCTTAACCAGGTTGG	182
SLC6A1 u2	SLC6A 1	G	A	A	A	cds	GE1149	AGAGCCTTTTC AAGCCCCTA	CAGGATCCTTT TTGCAGGGT	AGAGCCTTTTCAAGCCCCTAgcttgtttatgggttattttgtttttgtcattttagggtgnaggc aactccaaggttcctactctctttctgtgcctgttacccaccccgtcctcctagggtgcccttga gccgcaaaactgctgtccacgtggaccgggggtgacatcgcacgtccatctgccaggacccctgc gtccaaattccgagacatggc[g/a]accaacggcagcaaggtggccgacgggcagatctccacc gaggtcagcgaggcccctgtggccaatgacaagcccaaaaccttggtggtcaaggtgcagaagaa ggcggcagacctccccgaccgggacacgtggaagggccgcttcgacttcctcatgtcctgtgtggg gctatgccatcggcctgggcaacgtctggaggttcccctatctctgcgggaaaaatggtggggga ggtgcctggcccggggactntctggctgggtctggnACCCTGCAAAAAGGATCCTG	511
SLC6A1 u3	SLC6A 1	A	G	Y	C	cds	GE1149	AGAGCCTTTTC AAGCCCCTA	CAGGATCCTTT TTGCAGGGT	AGAGCCTTTTCAAGCCCCTAgcttgtttatgggttattttgtttttgtcattttagggtgnaggc aactccaaggttcctactctctttctgtgcctgttacccaccccgtcctcctagggtgcccttga gccgcaaaactgctgtccacgtggaccgggggtgacatcgcacgtccatctgccaggacccctgc gtccaaattccgagacatggcgaccaacggcagcaaggtggccgacgggcagatctccaccgagg tcagcgaggcccctgtggccaatgacaagcccaaaaccttggtggtcaaggtgcagaagaaggcg gcagacctccccgaccgggacacgtggaagggccgcttcgacttcctcatgtcctgtgtgggct[a/g]tgccatcggcctgggcaacgtctggaggttcccctatctctgcgggaaaaatggtggggga ggtgcctggcccggggactntctggctgggtctggnACCCTGCAAAAAGGATCCTG	511
SLC6A1 u4	SLC6A 1	A	C	R	R	cds	GE1149	AGAGCCTTTTC AAGCCCCTA	CAGGATCCTTT TTGCAGGGT	AGAGCCTTTTCAAGCCCCTAgcttgtttatgggttattttgtttttgtcattttagggtgnaggc aactccaaggttcctactctctttctgtgcctgttacccaccccgtcctcctagggtgcccttga gccgcaaaactgctgtccacgtggaccgggggtgacatcgcacgtccatctgccaggacccctgc gtccaaattccgagacatggcgaccaacggcagcaaggtggccgacgggcagatctccaccgagg tcagcgaggcccctgtggccaatgacaagcccaaaaccttggtggtcaaggtgcagaagaaggcg gcagacctccccgaccgggacacgtggaagggccgcttcgacttcctcatgtcctgtgtgggcta tgccatcggcctgggcaacgtctgg[a/c]ggttcccctatctctgcgggaaaaatggtggggga ggtgcctggcccggggactntctggctgggtctggnACCCTGCAAAAAGGATCCTG	511

FIG. 5FFFFFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SLC6A1 u5	SLC6A 1	C	A	I	I	cds	GE1097	AGGAGGAGGGG TCACCAGT	CCTGGTCTACA GTGAGGGTCA	AGGAGGAGGGGTCACCAGTcacccactttcctcccaggtggtctacttttcagccacataccccta acat[c/a]atngctgnatcatcctngttcttccgtggagtgacgctgcccggggccaaggaggg catcctcttctacatcacacccaacttccgcaagctgtctgactccgaggtgagtgcccctccca gcccggattctgagccaccacttagcagctttgagataagcttttgcatctttnTGACCCTCACT GTAGACCAGG	270
SLC6A1 u6	SLC6A 1	G	T	T	T	cds	GE1078	CCGGCTCCCAC CAGCTC	CCTGTTCCTTT ATCCAGTGCC	CCGGCTCCCACCAGCTCtgtgtaactttctcctccctccactgtttgaccaggcgcaacatgcat cagatgacggacgggctggataagccaggtcagatccgctggccactggccatcac[g/t]ctgg ccatcgcctggatccttgtgtatttctgtatctggaagggtgttggctggactggaaaggtaagg gatatatgtgcacagtggggacaggagGGCACTGGATAAAGGAACAGG	243
SLC6A1 u7	SLC6A 1	T	A	I	N	cds	GE1044	AATTCCGTATT AAATGGACG	GTGGTTTTTGT TGGATGGGG	AATTCCGTATTAAATGGACGngggtntgtgttccgctcccaggcgtgggccttgcggctgctgtg ctatcattctggctgaacatctactaca[t/a]cgtcatcatctcctgggccatttactacctgt acaactccttcaccacggtgagtggtccactttgacccCCCCATCCAACAAAAACCAC	188
SLC6A1 u8	SLC6A 1	G	C	C	S	cds	GE1250	GCAGACACTGC CGTGGA	CTCCTGCCGGG CTCTGG	GCAGACACTGCCGTGGAaacagtgcgacaacccctggaacacagaccgct[g/c]cttctccaac tacagcatggtcaacactaccaacatgaccagcgctgtggtggagttctgggagtgagtatggca taatcaggggatggcagggacggggcatgtcagCCAGAGCCCGGCAGGAG	180
SLC6A3 d13	SLC6A 3	G	A	R	Q	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgc[g/a]gtggcagctcacagcctgcctggtgctggtcatcgtgctgctctacttcagcctctggaagggc gtgaagacctcagggaaggtgaggctcgggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 d14	SLC6A 3	G	A	V	M	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaa tgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaa ggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcacca acccgcggcagagcccc[g/a]tggaggcccaggatcgggagacctggggcaagaagatcgactt tctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgct acaAAAATGGTGGCGGTAAG	345
SLC6A3 u1	SLC6A 3	C	G	L	V	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgcggtg gcag[c/g]tcacagcctgcctggtgctggtcatcgtgctgctctacttcagcctctggaagggc gtgaagacctcagggaaggtgaggctcgggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 u10	SLC6A 3	G	T	P	P	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaa tgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaa ggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcacca accc[g/t]cggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactt tctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgct acaAAAATGGTGGCGGTAAG	345
SLC6A3 u11	SLC6A 3	C	A	L	I	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgcggtg gcagctcacagcctgcctggtgctggtcatcgtgctgctctacttcagc[c/a]tctggaagggc gtgaagacctcagggaaggtgaggctcgggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 u12	SLC6A 3	G	C	V	V	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgcggtg gcagctcacagcctgcctggtgctggtcatcgtgctgctctacttcagcctctggaagggcgt[g /c]aagacctcagggaaggtgaggctcgggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 u2	SLC6A 3	A	G	I	V	cds	GE1043	CAAGGGCCCTG CCTGTG	ACAGACGCCTC GCAGAGC	CAAGGGCCCTGCCTGTGcagcctggtgacactgtcttctcttgcaggtggtatgg[a/g]tcaca gccaccatgccatacgtggtcctcactgccctgctcctgcgtggggtcaccctccctggagccat agacggcatcagagcatacctgagcgttgacttctaccgGCTCTGCGAGGCGTCTGT	187

FIG. 5GGGGGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SLC6A3 u3	SLC6A 3	G	A	S	S	cds	GE990	TCAGGGCCAGG GCTGAT	CACGGCGCTGT CGATAC	TCAGGGCCAGGGCTGATcttcatcatctacccggaagccatcgccacgctccctctgtcctc[g/a]gcctgggccgtggtcttcttcatcatgctgctcaccctggGTATCGACAGCGCCGTG	124
SLC6A3 u4	SLC6A 3	C	T	A	A	cds	GE1043	CAAGGGCCCTG CCTGTG	ACAGACGCCTC GCAGAGC	CAAGGGCCCTGCCTGTGcagcctggtgacactgtcttctcttgcaggtggtatggatcacagc[c/t]accatgccatacgtggtcctcactgccctgctcctgcgtggggtcaccctccctggagccatagacggcatcagagcatacctgagcgttgacttctaccgGCTCTGCGAGGCGTCTGT	187
SLC6A3 u5	SLC6A 3	C	T	A	A	cds	GE1273	CTTTGTCCTGG CACCGC	AGCCTTTCTGG TGGCCTCA	CTTTGTCCTGGCACCGCcggctgagagctgcctgacctccgtatctgctggttgcagttcgtggtcgtggtcagcattgtgaccttcagaccccccactacggagcctacatcttccccgactgggccaacgcgctgggctgggtcatcgccacatcctccatggccatggtgcccatctatgcggc[c/t]tacaagttctgcagcctgcctgggtcctttcgagaggtgggtatttggacggggcgccttcacccgagtgTGAGGCCACCAGAAAGGCT	282
SLC6A3 u6	SLC6A 3	C	T	N	N	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggcccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaa[c/t]ggagtgcagctcaccagctccaccctcaccaaccaacccgcggcagagcccgtggaggcccaggatcgggagacctggggcaagaagatcgacttttctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A3 u7	SLC6A 3	C	T	P	P	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggcccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcaccaacccgcggcagagccc[c/t]gtggaggcccaggatcgggagacctggggcaagaagatcgacttttctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A3 u8	SLC6A 3	G	C	R	R	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggcccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcaccaacccgcggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactttctcctgtccgtcattggctttgctgtggacctggccaacgtctggcg[g/c]ttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A3 u9	SLC6A 3	C	G	A	G	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggcccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcaccaacccgcggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactttctcctgtccgtcattggctttgctgtggacctgg[c/g]caacgtctggcggttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A4 d10	SLC6A 4	A	C	K	N	cds	GE1113	CATCTCTATCT GAGTGGATATT GT	TTTTCTCCCAA AACAATTAGTA GTC	CATCTCTATCTGAGTGGATATTGTtaaggtttttaatgtgtcttggaatttctgttttagttcatcatttgcagttttctgatgagcccgccacaactacgacttttccaatataattatccttactggagtatcatcttgggttactgcataggaacctcatctttcatttgcatccccacatatatagcttatcggttgatcatcactccagggacatttaa[a/c]gaggtacgtgctagttagtgtgtatatgtgtgtgttcaGACTACTAATTGTTTTGGGAGAAAA	292
SLC6A4 d9	SLC6A 4	G	A	T	T	cds	GE1071	TGTGACATCTT TGTAGGACAGG T	CCTCCTTTCCT CTTCATCC	TGTGACATCTTTGTAGGACAGGTcttgtcaaccacctcctcctctctccctctgtctcaggtccccagcctcctcttcatcacgtatgcagaagcgatagccaacatgccagcgtccactttctttgccatcatcttctttctgatgttaatcacgctgggcttggacagcac[g/a]gtgaggaaatgggaaggggaaatgggctgtgggaGGATGAAGAGGAAAGGAGG	231

FIG. 5HHHHHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SLC6A4 u1	SLC6A 4	G	C	K	N	cds	GE1124	CCGTTGGGCCA CCCTTA	TGGCCTGCCCC TAACAGG	CCGTTGGGCCACCCTTAaactcggcctctgtctctccatcttacccactgcccagggattggtta tgccatctgcatcattgccttttacattgcttcctactacaacaccatcatggcctgggcgctat actacctcatctcctccttcacggaccagctgccctggaccagctgcaa[g/c]aactcctggaa cactggcaactgcaccaattacttctccgaggacaacatcacctggaccctccattccacgtccc ctgctgaagaattttacacgcgccacgtaagtcacgtaagtaggggttggCCTGTTAGGGGCAGG CCA	328
SLC6A4 u2	SLC6A 4	C	A	-	-	noncoding	GE1027	AGCATCAGTAA CCTGCACACTC	ATTTGCAAGCC CGACTGGT	AGCATCAGTAACCTGCACACTCttctccctaggtctcctggaggcaaggcgaccttgcttgccct ctattgcagaataacaaggggcttagccacaggagttg[c/a]tggcaagtggaaagaagaacaa atggtgagcagcagggaagtttaaggACCAGTCGGGCTTGCAAAT	175
SLC6A4 u3	SLC6A 4	A	C	-	-	noncoding	GE1027	AGCATCAGTAA CCTGCACACTC	ATTTGCAAGCC CGACTGGT	AGCATCAGTAACCTGCACACTCttctccctaggtctcctggaggcaaggcgaccttgcttgccct ct[a/c]ttgcagaataacaaggggcttagccacaggagttgctggcaagtggaaagaagaacaa atggtgagcagcagggaagtttaaggACCAGTCGGGCTTGCAAAT	175
SLC6A4 u4	SLC6A 4	G	C	G	A	cds	GE1145	AAATCCAAGCA CCCAGAGAT	ACTCCGGGTCA CAGCCCAC	AAATCCAAGCACCCAGAGATcaattgggatccttggcagatggacatcagtgtcatttactaacc agcaggatggagacgacgcccttgaattctcagaagcagctatcagcgtgtgaagatggagaaga ttgtcaggaaaacggagttctacagaaggttgttcccaccccaggggacaaagtggagtccgggc aaatatccaatgggtactcagcagttccaagtcctggtgcgg[g/a]agatgacacacggcactc tatcccagcgaccaccaccaccctagtggctgagcttcatcaaggggaacgggagacctggggca agaaggtggatttccttctctcagtgattggctatgctgtggacctgggcaatgtctggcgcttc ccctacatatgttaccagaatggaggggtcagtatcacaggctgcgagtagtggctgtgaccca ggGTGGGCTGTGACCCGGAGT	476
SLC6A4 u5	SLC6A 4	G	C	M	I	cds	GE1124	CCGTTGGGCCA CCCTTA	TGGCCTGCCCC TAACAGG	CCGTTGGGCCACCCTTAaactcggcctctgtctctccatcttacccactgcccagggattggtta tgccatctgcatcattgccttttacattgcttcctactacaacaccatcat[g/c]gcctgggcg ctatactacctcatctcctccttcacggaccagctgccctggaccagctgcaagaactcctggaa cactggcaactgcaccaattacttctccgaggacaacatcacctggaccctccattccacgtccc ctgctgaagaattttacacgcgccacgtaagtcacgtaagtaggggttggCCTGTTAGGGGCAGG CCA	328
SLC6A4 u6	SLC6A 4	C	T	F	F	cds	GE1124	CCGTTGGGCCA CCCTTA	TGGCCTGCCCC TAACAGG	CCGTTGGGCCACCCTTAaactcggcctctgtctctccatcttacccactgcccagggattggtta tgccatctgcatcattgccttttacattgcttcctactacaacaccatcatggcctgggcgctat actacctcatctcctccttcacggaccagctgccctggaccagctgcaagaactcctggaacact ggcaactgcaccaattactt[c/t]tccgaggacaacatcacctggaccctccattccacgtccc ctgctgaagaattttacacgcgccacgtaagtcacgtaagtaggggttggCCTGTTAGGGGCAGG CCA	328
SLC6A4 u7	SLC6A 4	C	A	-	-	noncoding	GE1027	AGCATCAGTAA CCTGCACACTC	ATTTGCAAGCC CGACTGGT	AGCATCAGTAACCTGCACACTCttctccctaggtctcctggaggcaagg[c/a]gaccttgcttg ccctctattgcagaataacaaggggcttagccacaggagttgctggcaagtggaaagaagaacaa atggtgagcagcagggaagtttaaggACCAGTCGGGCTTGCAAAT	175
SLC6A4 u8	SLC6A 4	A	G	T	A	cds	GE1079	CTTAGACCCCT GATCTTGGA	TCAAAGCAAAG CAACTCAG	CTTAGACCCCTGATCTTGGAactgtctcaggcggccccttgggttttcccctccagagatgccct ggtg[a/g]ccagcgtggtgaactgcatgacgagcttcgtttcgggatttgtcatcttcacagtg ctcggttacatggctgagatgaggaatgaagatgtgtctgaggtggccaaagacgcaggtaggac ctcgggttctatgcaggtcccttgctcctaCTGAGTTGCTTTGCTTTGA	244
TBXAS1 e15	TBXAS 1	C	A	L	I	cds	GE282	CCTTCATCTGC AGCCATTT	TTGTCAGCAAT TATGGACAGTT A	CCTTCATCTGCAGCCATTTagggtgtactcccggcatggtgccctaattacacctttgttatcca ttatcagatggttcccctcatcagccaagcctgcgacctt[c/a]tcctggctcatttaaaacgc tatgcggaatctggggacgcatttgacatccagaggtaaggctgctgcattacagatgagaaatc gagtttttgaatcactgcttcttgTAACTGTCCATAATTGCTGACAA	242

FIG. 5IIIIIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
TBXAS1 a16	TBXAS 1	A	G	-	-	noncoding	GE332	CGAGATTGAAA TTTAAGGAAAA GAC	CCAGAAACACA AGTGGTAACTG A	CGAGATTGAAATTTAAGGAAAAGACaaaatgctgtgagatttgggctaacacga[a/g]cttctc cctttgtcacgacccctccatcagatggccctgagttctgcagcctcgaggaaggcctgcccta tctggacatggtgattgcagagacgctgaggatgtacccgccagctttcaggtgtgtggtagccc cctcccctgcccgagtccccacctcctacccctacccccctgccccagcctgcaggtcagggccct cctccaTCAGTTACCACTTGTGTTTCTGG	289
TBXAS1 a17	TBXAS 1	C	T	-	-	noncoding	GE332	CGAGATTGAAA TTTAAGGAAAA GAC	CCAGAAACACA AGTGGTAACTG A	CGAGATTGAAATTTAAGGAAAAGACaaaatgctgtgagatttgggctaacacgaacttctcccctt tgtcacgacccctccat[c/t]agatggcccctgagttctgcagcctcgaggaaggcctgcccta tctggacatggtgattgcagagacgctgaggatgtacccgccagctttcaggtgtgtggtagccc cctcccctgcccgagtccccacctcctacccctacccccctgccccagcctgcaggtcagggccct cctccaTCAGTTACCACTTGTGTTTCTGG	289
TBXAS1 d12	TBXAS 1	C	G	Q	E	cds	GE257	TGCTGTTCCAA ATTGTTTACTG A	TTCAACACGTG AAAATCAAAAT	TGCTGTTCCAAATTGTTTACTGAataagtttgaataattggaattttgcttaatcttattcttac tatagtgctgtgtttccttcaggggtttttgggaaagc[c/g]aaatggagctcagaaagctgta tggacctctgtgtgggtaagaaggaaactcaaccgttctattatgtacgatattttctattatgt acgatATTTTGATTTTCACGTGTTGAA	222
TBXAS1 d13	TBXAS 1	G	A	R	H	cds	GE326	TGGAAACCTAT TCTTTTGCCTT T	TACAGCCATGA GCCACTGT	TGGAAACCTATTCTTTTGCCTTTacttccagagagctcagtaattctaggttcctaatagagcct aaagcatgagtgcaacttcatttctcagcttttgaaatctgcttttccctccaggtactccacat cagcattctcaagactggagaagttaggcctcagacatcccaagccttctcctttcattggaaac ttgacatttttcc[g/a]ccaggtaagggctgtcttccattggcttccatcataaaatatgctga gggccaggcACAGTGGCTCATGGCTGTA	288
TBXAS1 d14	TBXAS 1	G	A	-	-	noncoding	GE355	CTTGGAGCATC CTTGTCTCA	GCTCTCACGCA GAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagg gagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagc agcaccggcccttcacgtacctgcccttcggggccggcccacggagctgcctcggggtgcatcta gggctgcttgaggtcaagttgacactgctccacgtgctgcacaagttccggttccaagcctgccc tgagacccaggtgaggcccccctgctcagaggcag[g/a]tacaggggcagcggtgggagggcca ccCCAGTTCTCTGCGTGAGAGC	347
TBXAS1 u1	TBXAS 1	G	C	V	L	cds	GE355	CTTGGAGCATC CTTGTCTCA	GCTCTCACGCA GAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagg gagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagc agcaccggcccttcacgtacctgcccttcggggccggcccacggagctgcctcggggtgcatcta gggctgcttgaggtcaagttgacactgctccac[g/c]tgctgcacaagttccggttccaagcctg ccctgagacccaggtgaggcccccctgctcagaggcaggtacaggggcagcggtgggagggcca ccCCAGTTCTCTGCGTGAGAGC	347
TBXAS1 u10	TBXAS 1	A	C	-	-	noncoding	GE249	ATGGACCTGTA TTGCCACCA	GAGAGTTTGCA TTTCTCATGTC TTA	ATGGACCTGTATTGCCACCAaggtggctttggctccctgagtcctgaccctctgcttgtt[a/c] cttcccaacaggcgtcgggtttggagttcaagtcggtagccgacagcgttctgtttttacgtgac aaaagatgggaagaggtcagaggtgccctgatgtctgctttcagtcctgaaaagctgaacgaggT AAGACATGAGAAATGCAAACTCTC	219
TBXAS1 u11	TBXAS 1	C	T	T	M	cds	GE355	CTTGGAGCATC CTTGTCTCA	GCTCTCACGCA GAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagg gagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagc agcaccggcccttca[c/t]gtacctgcccttcggggccggcccacggagctgcctcggggtgca tctagggctgcttgaggtcaagttgacactgctccacgtgctgcacaagttccggttccaagcct gccctgagacccaggtgaggcccccctgctcagaggcaggtacaggggcagcggtgggagggcca ccCCAGTTCTCTGCGTGAGAGC	347

FIG. 5JJJJJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
TBXAS1 u2	TBXAS 1	G	A	A	T	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagctcaggactgcgaggtgctggggcagcg catccccgcaggc[g/a]ctgtgctagagatggccgtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237
TBXAS1 u3	TBXAS 1	C	T	A	A	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagctcaggactgcgaggtgctggggcagcg catccccgcaggcgctgtgctagagatggc[c/t]gtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237
TBXAS1 u4	TBXAS 1	C	G	Q	E	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagct[c/g]aggactgcgaggtgctggggc agcgcatccccgcaggcgctgtgctagagatggccgtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237
TBXAS1 u5	TBXAS 1	G	A	R	Q	cds	GE355	CTTGGAGCATC CTTGTCTCA	GCTCTCACGCA GAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagg gagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagc agcaccggcccttcacgtacctgcccttcggggccggcccacggagctgcctcggggtgcatcta gggctgcttgaggtcaagttgacactgctccacgtgctgcacaagttcc[g/a]gttccaagcct gccctgagacccaggtgaggcccccctgctcagaggcaggtacaggggcagcggtgggagggcca ccCCAGTTCTCTGCGTGAGAGC	347
TBXAS1 u6	TBXAS 1	T	G	V	G	cds	GE470	GGCCCTGGTTT ATTATCACC	CCAAAGTCGGC TCCATTC	GGCCCTGGTTTATTATCACCccctttttcaatgccacttttgtttttctctttcaagtatcatttc catccataatggtcccactggcccggattttgcccaataagaaccgagacgaactgaatggcttt tttaacaaactcattaggaatg[t/g]gattgccttgcgggaccagcaagctgccgaagaggtaa cgtattttaataggacacagccttgaaatgGAATGGAGCCGACTTTGG	243
TBXAS1 u7	TBXAS 1	T	C	I	T	cds	GE912	GCCCATGTATC TTCCTCCTTT	GGGGGATCCAA CTTGTACT	GCCCATGTATCTTCCTCCTTTgttctccaggaagcctcactcttcatgactgtaaggtcaaaatg tgcatttttctccttttgttccttagaggcggagagacttcctccaaatggtcctggatgcccga cattctgcaagtcccatgggcgtgcaagactttgacatcgtcagagacgttttctcctctactgg gtgcaagccgaacccttcccggcaacaccagcccagccctatggccaggcctttgactgtggatg aga[t/c]tgtgggccaggccttcatcttcctcatcgctggctatgaaatcatcaccaacacact ttcttttgccacctacctactggccaccaaccctgactgccaagagaagcttctgagagaggtag acgtttttaaggagaaacacgtgAGTACAAGTTGGATCCCCC	432
TBXAS1 u8	TBXAS 1	C	G	L	V	cds	GE912	GCCCATGTATC TTCCTCCTTT	GGGGGATCCAA CTTGTACT	GCCCATGTATCTTCCTCCTTTgttctccaggaagcctcactcttcatgactgtaaggtcaaaatg tgcatttttctccttttgttccttagaggcggagagacttcctccaaatggtcctggatgcccga cattctgcaagtcccatgggcgtgcaagactttgacatcgtcagagacgttttctcctctactgg gtgcaagccgaacccttcccggcaacaccagcccagccctatggccaggcctttgactgtggatg agattgtgggccaggccttcatcttcctcatcgctggctatgaaatcatcaccaacacactttct tttgccacctac[c/g]tactggccaccaaccctgactgccaagagaagcttctgagagaggtag acgtttttaaggagaaacacgtgAGTACAAGTTGGATCCCCC	432
TBXAS1 u9	TBXAS 1	T	G	M	R	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagctcaggactgcgaggtgctggggcagcg catccccgcaggcgctgtgctagaga[t/g]ggccgtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237

FIG. 5KKKKKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THBDu1	THBD	T	G	C	G	cds	GE409	TCGGCTTACAG CTAATGTGC	GCCAGCTAAGG TGCTTTGGT	TCGGCTTACAGCTAATGTGCaccgcgccgcccggagcggtccaggggcactgggccagggaggcg ccgggcgcttgggactgcagcgtggagaacggcggctgcgagcacgcgtgcaatgcgatccctgg ggctccccgctgccagtgcccagccggcgccgccctgcaggcagacgggcgctcctgcaccgcat ccgcgacgcagtcctgcaacgacctctgcgagcacttctgcgttcccaaccccgaccagccgggc tcctactcgtgcatgtgcgagaccggctaccggctggcggccgaccaacaccggtgcgaggacgt ggatgactgcatactggagcccagtccgtgtccgcagcgctgtgtcaacacacagggtggcttcg agtgccactgctaccctaactacgacctggtggacggcgag[t/g]gtgtggagcccgtggaccc gtgcttcagagccaactgcgagtaccagtgccagcccctgaaccaaactagctacctctgcgtct gcgccgagggcttcgcgcccattccccacgagccgcacaggtgccagatgttttgcaaccagact gcctgtccagccgactgcgaccccaacacccaggctagctgtgagtgccctgaaggctacatcct ggacgacggtttcatctgcacggacatcgacgagtgcgaaaacggcggcttctgctccggggtgt gccacaacctccccggtaccttcgagtgcatctgcgggcccgactcggcccttgcccgccacatt ggcaccgactgtgactccggcaaggtggacggtggcgacagcggctctggcgagcccccgcccag cccgacgcccggctccaccttgactcctccggccgtggggctcgtgcattcgggcttgctcatag gcatctccatcgcgagcctgtgcctggtggtggcgcttttggcgctcctctgccacctgcgcaag aagcagggcgccgccagggccaagatggagtacaagtgcgcggcccctt	1164
THBDu2	THBD	C	A	P	T	cds	GE409	TCGGCTTACAG CTAATGTGC	GCCAGCTAAGG TGCTTTGGT	TCGGCTTACAGCTAATGTGCaccgcgccgcccggagcggtccaggggcactgggccagggaggcg ccgggcgcttgggactgcagcgtggagaacggcggctgcgagcacgcgtgcaatgcgatccctgg ggctccccgctgccagtgcccagccggcgccgccctgcaggcagacgggcgctcctgcaccgcat ccgcgacgcagtcctgcaacgacctctgcgagcacttctgcgttcccaaccccgaccagccgggc tcctactcgtgcatgtgcgagaccggctaccggctggcggccgaccaacaccggtgcgaggacgt ggatgactgcatactggagcccagtccgtgtccgcagcgctgtgtcaacacacagggtggcttcg agtgccactgctaccctaactacgacctggtggacggcgagtgtgtggagcccgtggacccgtgc ttcagagccaactgcgagtaccagtgccag[c/a]ccctgaaccaaactagctacctctgcgtct gcgccgagggcttcgcgcccattccccacgagccgcacaggtgccagatgttttgcaaccagact gcctgtccagccgactgcgaccccaacacccaggctagctgtgagtgccctgaaggctacatcct ggacgacggtttcatctgcacggacatcgacgagtgcgaaaacggcggcttctgctccggggtgt gccacaacctccccggtaccttcgagtgcatctgcgggcccgactcggcccttgcccgccacatt ggcaccgactgtgactccggcaaggtggacggtggcgacagcggctctggcgagcccccgcccag cccgacgcccggctccaccttgactcctccggccgtggggctcgtgcattcgggcttgctcatag gcatctccatcgcgagcctgtgcctggtggtggcgcttttggcgctcctctgccacctgcgcaag aagcagggcgccgccagggccaagatggagtacaagtgcgcggcccctt	1164

FIG. 5LLLLLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THBDu3	THBD	C	T	P	P	cds	GE407	GACGGACAGGA GAGGCTGT	GGTTGGGAACG CAGAAGTG	GACGGACAGGAGAGGCTGTcgccatcggcgtcctgtgcccctctgctccggcacggccctgtcgc agtgcccgcgctttccccggcgcctgcacgcggcgcgcctgggtaacatgcttggggtcctggtc cttggcgcgctggccctggccggcctggggttccccgcacccgcagagccgcagccgggtggcag ccagtgcgtcgagcacgactgcttcgcgctctacccgggccccgcgaccttcctcaatgccagtc agatctgcgacggactgcggggccacctaatgacagtgcgctcctcggtggctgccgatgtcatt tccttgctactgaacggcgacggcggcgttggccgccggcgcctctggatcggcctgcagctgcc acccggctgcggcgaccccaagcgcctcgggcccctgcgcggcttccagtgggttacgggagaca acaacaccagctatagcaggtgggcacggctcgacctcaatggggctcccctctgcggcccgttg tgcgtcgctgtctccgctgctgaggccactgtgcccagcgagccgatctgggaggagcagcagtg cgaagtgaaggccgatggcttcctctgcgagttccacttcccagccacctgcaggccactggctg tggagcccggcgccgcggctgccgccgtctcgatcacctacggcaccccgttcgcggcccgcgga gcggacttccaggcgctgccggtgggcagctccgccgcggtggctcc[c/t]ctcggcttacagc taatgtgcaccgcgccgcccggagcggtccaggggcactgggccagggaggcgccgggcgcttgg gactgcagcgtggagaacggcggctgcgagcacgcgtgcaatgcgatccctggggctccccgctg ccagtgcccagccggcgccgccctgcaggcagacgggcgctcctgcaccgcatccgcgacgcagt cctgcaacgacctctgcgagCACTTCTGCGTTCCCAACC	1014
THPOa6	THPO	G	A	-	-	noncoding	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcagg accatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccat cttcctgagcttccaacacctgctccgaggaaaggtgcgtttcctgatgcttgtaggagggtcca ccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcaca ctgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagccagaac tactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctgaacc aaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaatgga actcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcaggaac atcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccatcctc ctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagctccac cccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacatccta cacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagcattgt ctc[g/a]tgtacagctcccttccctgcagggcgcccctggGAGACAACTGGACAAGATTTCCT	844
THPOa7	THPO	G	A	-	-	noncoding	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcagg accatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccat cttcctgagcttccaacacctgctccgaggaaaggtgcgtttcctgatgcttgtaggagggtcca ccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcaca ctgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagccagaac tactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctgaacc aaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaatgga actcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcaggaac atcagacacaggctccctgccaacccaacctccagcctggatattctccttccccaacccatcctc ctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagctccac cccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacatccta cacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagcattgt ctcgtgtacagctcccttccctgcagg[g/a]cgcccctggGAGACAACTGGACAAGATTTCCT	844

FIG. 5MMMMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	#
THPOd5	THPO	C	?	-	-	noncoding	GE345	TCACTCTGCTG GCTACTCCTAA	CCTTCTTCCCT CAGGTCTTCTA	TCACTCTGCTGGCTACTCCTAggctccccaccgc tctcttctccatcttcttctcaggaggagaccaagg ctgctggagggagtgatggcagcacgggggacaactg gcagctttctggacaggtccgtctcctccttgggc gtccccagtcaagggatctgtagaaactgttctttt AGGGAAGAAGG	336
THPOu1	THPO	T	A	S	T	cds	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcct accatcctctgccctcagcttcctccacagggcagg cttcctgagctccaacacctgctccgaggaaaggtt ccctctgcgtcaggcgggcccccacccaccacagctg ctgaacgagctcccaaacaggacttctggattgttg tactggctctgggcttctgaagtggcagcag[g/a] aaccaaaccctccaggtcccctggaccaaatcccccgga tggaactcgtggacttttccttgaccttctgctccaacgcc gaacatcagacacaggctccctgccacccaacctcc cctcctactggacagtatacgctctttccctctttcca ccacccccctgcttcctgaccctctgctccaacgcc cctacacccacctccagaatctgtctcaggaaggggtt ttgtctcgtgtacagctccctttccctgcagggcgcc	844
THPOu1	THPO	C	?	-	-	noncoding	GE345	TCACTCTGCTG GCTACTCCTAA	CCTTCTTCCCT CAGGTCTTCTA	TCACTCTGCTGGCTACTCCTAggctccccaccgc tctcttctccatcttcttctcaggaggagaccaagg ctgctggagggagtgatggcagcacgggggacaactg gcagctttctggacaggtccgtctcctccttgggc gtccccagtcaagggatctgtagaaactgttctttt AGGGAAGAAGG	336
THPOu1	THPO	T	A	S	T	cds	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcct accatcctctgccctcagcttcctccacagggcagg cttcctgagctccaacacctgctccgaggaaaggtt ccctctgcgtcaggcgggcccccacccaccacagctg ctgaacgagctcccaaacaggacttctggattgttg tactggctctgggcttctgaagtggcagcag[g/a] aaccaaaccctccaggtcccctggaccaaatcccccgga tggaactcgtggacttttccttgaccttctgctccaacgcc gaacatcagacacaggctccctgccacccaacctcc cctcctactggacagtatacgctctttccctctttcca ccacccccctgcttcctgaccctctgctccaacgcc cctacacccacctccagaatctgtctcaggaaggggtt ttgtctcgtgtacagctccctttccctgcagggcgcc	844
THPOu2	THPO	A	G	Q	R	cds	GE265	TGGAGGACTAG CCTGCTTATTA	AGAATCCATGG GAAGCAGTG	TGGAGGACTAGCCTGCTTATTAggctaccatagctc caatctttttcaacagagcc[a/g]gtgcccagagg cctgctgtggactttagcttgggagaatggaaaacc ggcttccctaagtcctgtcttcagtttcccCACTGCT	244
THPOu3	THPO	G	A	G	R	cds	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcct accatcctctgccctcagcttcctccacagggcagg cttcctgagctccaacacctgctccgaggaaaggtt ccctctgcgtcaggcgggcccccacccaccacagctg ctgaacgagctcccaaacaggacttctggattgttg tactggctctgggcttctgaagtggcagcag[g/a] aaccaaaccctccaggtcccctggaccaaatcccccgga tggaactcgtggacttttccttgaccttctgctccaacgcc gaacatcagacacaggctccctgccacccaacctcc cctcctactggacagtatacgctctttccctctttcca ccacccccctgcttcctgaccctctgctccaacgcc cctacacccacctccagaatctgtctcaggaaggggtt ttgtctcgtgtacagctccctttccctgcagggcgcc	844

FIG. 5NNNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THPOu4	THPO	A	T	K	M	cds	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcagg accatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccat cttcctgagcttccaacacctgctccgaggaa[a/t]ggtgcgtttcctgatgcttgtaggaggg tccaccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcct cacactgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagcca gaactactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctg aaccaaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaa tggaactcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcag gaacatcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccat cctcctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagct ccacccccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacat cctacacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagca ttgtctcgtgtacagctcccttccctgcagggcgcccctggGAGACAACTGGACAAGATTTCCT	844
THu1	TH	G	A	S	S	cds	GE1125	GGTCCCCGGGT CTCAGC	AGCCCCACCCA CAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttc attgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagc ggccgctgcagtcccctc[g/a]gagcccggggacccccctggaggctgtggcctttgaggagaag gaggggaaggccgtgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccg agctgtgaaggtgtttgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGT GGGGCT	331
THu2	TH	G	A	V	M	cds	GE1125	GGTCCCCGGGT CTCAGC	AGCCCCACCCA CAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttc attgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagc ggccgctgcagtcccctcggagcccggggaccccctggaggctgtggcctttgaggagaaggagg ggaaggcc[g/a]tgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccg agctgtgaaggtgtttgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGT GGGGCT	331
THu3	TH	T	G	F	C	cds	GE1125	GGTCCCCGGGT CTCAGC	AGCCCCACCCA CAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttc attgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagc ggccgctgcagtcccctcggagcccggggaccccctggaggctgtggcctttgaggagaaggagg ggaaggccgtgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccgagct gtgaaggtgt[t/g]tgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGT GGGGCT	331
THu4	TH	G	A	K	K	cds	GE1020	CTGCCCGCAGG AAGGAG	CTGGGCACACC CTTCAG	CTGCCCGCAGGAAGGAGgtctacaccacgctgaa[g/a]ggcctctacgccacgcacgcctgcgg ggagcacctggaggcctttgctttgctggagcgcttcagcggctaccgggaagacaatatccccc agctggaggacgtctcccgcttcCTGAAGGGTGTGCCCAG	170
THu5	TH	T	C	A	A	cds	GE1125	GGTCCCCGGGT CTCAGC	AGCCCCACCCA CAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttc attgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagc ggccgctgcagtcccctcggagcccggggaccccctggaggc[t/c]gtggcctttgaggagaag gaggggaaggccgtgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccg agctgtgaaggtgtttgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGT GGGGCT	331
THu6	TH	G	T	A	A	cds	GE972	TACGCGCAGGG ACTGCT	GCGTACCTGCG AGAACT	TACGCGCAGGGACTGCTgccacgagctgctggggcacgtgcccatgctggccgaccgcaccttcg c[g/t]cAGTTCTCGCAGGTACGC	89

FIG. 50000000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
VLDLRd 13	VLDLR	C	T	A	A	cds	GE926	GAAAGACCTTG CCTTCTTAAAG C	CAAGTGACAAT GACTTATGTCA AGA	GAAAGACCTTGCCTTCTTAAAGCaaaactaagtaacccagacttccatcttgcaggcaaagagcc aagtctgatcttcactaatcgaagagacatcaggaagattggcttagagaggaaagaatatatcc aactagttgaacagctaagaaacactgtggctctcgatgctgacattgctgcccagaaactattc tgggc[c/t]gatctaagccaaaaggctatcttcaggtaactttcagttccttttgtggtgTCTT GACATAAGTCATTGTCACTTG	281
VLDLRd 14	VLDLR	A	T	-	-	noncoding	GE926	GAAAGACCTTG CCTTCTTAAAG C	CAAGTGACAAT GACTTATGTCA AGA	GAAAGACCTTGCCTTCTTAAAGCaaaactaagtaaccc[a/t]gacttccatcttgcaggcaaag agccaagtctgatcttcactaatcgaagagacatcaggaagattggcttagagaggaaagaatat atccaactagttgaacagctaagaaacactgtggctctcgatgctgacattgctgcccagaaact attctgggccgatctaagccaaaaggctatcttcaggtaactttcagttccttttgtggtgTCTT GACATAAGTCATTGTCACTTG	281
VLDLRd 15	VLDLR	G	T	-	-	noncoding	GE937	AGGTTTTGGCT CCTTACC	GGTAGCTCCAG ATGAACAAAAA	AGGTTTTGGCTCCTTACCtgatgggtaaatttctaagtctgaatacagatccttctaaactgatt ccttttattcctctgtagggatcaatgtgaccacagcagtatcagaggtcagtgttcccccaaaa gggacttctgccgcatgggccattcttcctctctgtaagta[g/t]atttcctannngtctgggt tcaagaacttcttagataccagatgaagatTTTTTGTTCATCTGGAGCTACC	247
VLDLRd 16	VLDLR	G	A	E	K	cds	GE940	CCTGGGTTTTA AATGTGAAAGA TA	TATCCTTTCCC ATCACCTGC	CCTGGGTTTTAAATGTGAAAGATATtaattgaaaataagttgtcaagtgantantacatttttat tccagatataaacgaatgcttggtaaataatggtggatgttctcatatctgcaaagacctagtta taggctac[g/a]agtgtgactgtgcagctgggtttgaactgatagataggaaaacctgtggagg tgagtctaagaagaaaacctggaccctGCAGGTGATGGGAAAGGATA	242
VLDLRd 17	VLDLR	C	T	N	N	cds	GE953	TTTTCACAGCT TTGTTTACTGG T	TGAAGATAGTT GAGTGGGTGGT	TTTTCACAGCTTTGTTTACTGGTcagactggggtgaaccagctaaaatagaaaaagcaggaatga atggattcgatagacgtccactggtgacagcggatatccagtggcctaa[c/t]ggaattacact tggtatgtatgttcttccttctcgACCACCCACTCAACTATCTTCA	176
VLDLRu 1	VLDLR	A	G	T	A	cds	GE920	GCTCTAATTGT GTCAAACTCTT AAAT	GACCTACACAG ATACCATTCCA AAG	GCTCTAATTGTGTCAAACTCTTAAATttcttgtgacctattctgtttcagtgcctcaattgatga caaggttggtagacatgttaaaatgatcgacaatgtctataatcctgcagccattgctgttgatt gggtgtacaagaccatctactggactgatgcggcttctaagactatttcagtagctaccctagat gga[a/g]ccaagaggaagttcctgtttaactctgacttgcgagagcctgcctccatagctgtgg acccactgtctgggtttgtagtctgttttccatcacagaCTTTGGAATGGTATCTGTGTAGGTC	324
VLDLRu 10	VLDLR	A	T	S	C	cds	GE937	AGGTTTTGGCT CCTTACC	GGTAGCTCCAG ATGAACAAAAA	AGGTTTTGGCTCCTTACCtgatgggtaaatttctaagtctgaatacagatccttctaaactgatt ccttttattcctctgtagggatcaatgtgaccacagcagtatcagaggtc[a/t]gtgttccccc aaaagggacttctgccgcatgggccattcttcctctctgtaagtagatttcctannngtctgggt tcaagaacttcttagataccagatgaagatTTTTTGTTCATCTGGAGCTACC	247
VLDLRu 11	VLDLR	T	C	I	I	cds	GE937	AGGTTTTGGCT CCTTACC	GGTAGCTCCAG ATGAACAAAAA	AGGTTTTGGCTCCTTACCtgatgggtaaatttctaagtctgaatacagatccttctaaactgatt ccttttattcctctgtagggatcaatgtgaccacagcagtatcagaggtcagtgttcccccaaaa gggacttctgccgcatgggccat[t/c]cttcctctctgtaagtagatttcctannngtctgggt tcaagaacttcttagataccagatgaagatTTTTTGTTCATCTGGAGCTACC	247
VLDLRu 12	VLDLR	A	T	S	C	cds	GE945	TCCAATACTAG ACTTAGCTCAC TT	GACTTACTGCT GGGTACGTG	TCCAATACTAGACTTAGCTCACTTagctacccctctgatttttttcagtgctcttagtgatggcag cagtaggtggctacttgatgtggcggaattggcaacacaagaacatgaaaagcatgaactttgac aatcctgtgtacttgaaaaccactgaagaggacctctccatagacattggtagacac[a/t]gtg cttctgttggacaCACGTACCCAGCAGTAAGTC	228
VLDLRu 2	VLDLR	A	G	K	R	cds	GE926	GAAAGACCTTG CCTTCTTAAAG C	CAAGTGACAAT GACTTATGTCA AGA	GAAAGACCTTGCCTTCTTAAAGCaaaactaagtaacccagacttccatcttgcaggca[a/g]ag agccaagtctgatcttcactaatcgaagagacatcaggaagattggcttagagaggaaagaatat atccaactagttgaacagctaagaaacactgtggctctcgatgctgacattgctgcccagaaact attctgggccgatctaagccaaaaggctatcttcaggtaactttcagttccttttgtggtgTCTT GACATAAGTCATTGTCACTTG	281

FIG. 5PPPPPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
VLDLRu 3	VLDLR	A	G	R	R	cds	GE920	GCTCTAATTGT GTCAAACTCTT AAAT	GACCTACACAG ATACCATTCCA AAG	GCTCTAATTGTGTCAAACTCTTAAATttcttgtgacctattctgtttcagtgcctcaattgatga caaggttggtag[a/g]catgttaaaatgatcgacaatgtctataatcctgcagccattgctgtt gattgggtgtacaagaccatctactggactgatgcggcttctaagactatttcagtagctaccct agatggaaccaagaggaagttcctgtttaactctgacttgcgagagcctgcctccatagctgtgg acccactgtctgggtttgtagtctgttttccatcacagaCTTTGGAATGGTATCTGTGTAGGTC	324
VLDLRu 4	VLDLR	A	G	Q	Q	cds	GE934	GAAATGGACTT GTGTTAATCCT G	TGCTGCTTCCC TTAAAGTAGTT AT	GAAATGGACTTGTGTTAATCCTGgatgtacatgctaattgtgggcttctgttttaggatcgtgtc tactggatagatggggaaaatgaagcagtctatggtgccaataaattcactggatcagagctagc cactctagtcaacaacctgaatgatgccca[a/g]gacatcattgtctatcatgaacttgtacag ccatcaggtaccgtggagaagcacagtccttaATAACTACTTTAAGGGAAGCAGCA	251
VLDLRu 5	VLDLR	A	C	E	A	cds	GE941	GCACCGGAATA CCCATTTTA	TTGCTTGTTGT AGGTTCTACTT GTG	GCACCGGAATACCCATTTTAatggtatttttttcctgactaggtaaaaattggtgtgaagaaga catgg[a/c]gaatggaggatgtgaatacctatgcctgccagcaccacagattaatgatcactct ccaaaatatacctgttcctgtcccagtgggtacaatgtagaggaaaatggccgagactgtcaaag taaggcattttgtgtttcaacCACAAGTAGAACCTACAACAAGCAA	241
VLDLRu 6	VLDLR	C	T	L	F	cds	GE944	TGTACCTAGTA AGGTATAGGAG CAGC	CACTTACTCAT AAAGGTACAAC AGCC	TGTACCTAGTAAGGTATAGGAGCAGCaagactaatttctgatttccctcccagatattgatgaatg ccaaaatccaggaatctgcagtcaaatttgtatcaacttaaaaggcggttacaagtgtgaatgta gtcgtggctatcaaatggat[c/t]ttgctactggcgtgtgcaaggcagtaggtaaatgaacttg gactggtatGGCTGTTGTACCTTTATGAGTAAGTG	230
VLDLRu 7	VLDLR	G	A	V	I	cds	GE236	ATTCTAGGGAG AAAAGCCAAA	TTTACTTACCA CAGTTCTTTTC ATCA	ATTCTAGGGAGAAAAGCCAAAtgtgaaccctcccaattccagtgcacaaatggtcgctgtattac gctgttgtggaaatgtgatggggatgaagactgt[g/a]ttgacggcagTGATGAAAAGAACTGT GGTAAGTAAA	140
VLDLRu 8	VLDLR	G	C	C	S	cds	GE911	CCAATCTTGAT GCATTTTCAG	CAGTTGATACA GGGAAAAGAAC TG	CCAATCTTGATGCATTTTCAGtggggcatcctctctcttaataggcaatataacatgtagtcccg acgagttcacctgctccagtggccgctgcatctccaggaactttgtatgcaatggccaggatgac tgcagcgatggcagtgatgagctggactgtgccccgccaacctgtggcgcccatgagttccagt[g/c]cagcacctcctcctgcatccccatcagctgggtatgcgacgatgatgcagactgctccgac caatctgatgagtccctggagcagtgtggccgtcagccagtcatacacaccaagtgtccagccag cgaaatccagtgcggctctggcgagtgcatccataagaagtggcgatgtgatggggaccctgact gcaaggatggcagtgatgaggtcaactgtcgtaagtagcttcctagcatggcatgttCAGTTCTT TTCCCTGTATCAACTG	471
VLDLRu 9	VLDLR	T	A	I	N	cds	GE941	GCACCGGAATA CCCATTTTA	TTGCTTGTTGT AGGTTCTACTT GTG	GCACCGGAATACCCATTTTAatggtatttttttcctgactaggtaaaaattggtgtgaagaaga catggagaatggaggatgtgaatacctatgcctgccagcaccacaga[t/a]taatgatcactct ccaaaatatacctgttcctgtcccagtgggtacaatgtagaggaaaatggccgagactgtcaaag taaggcattttgtgtttcaacCACAAGTAGAACCTACAACAAGCAA	241

FIG. 5QQQQQQQ

RESULT 2
AAC71304
ID AAC71304 standard; DNA; 318 BP.
XX
AC AAC71304;
XX
DT 09-FEB-2001 (first entry)
XX
DE Single nucleotide polymorphism containing sequence #378.
XX
KW Single nucleotide polymorphism; SNP; human; genetic disease;
KW disease susceptibility; cardiovascular system; endocrine system;
KW neurological system; forensic testing; paternity testing; ds.
XX
OS Homo sapiens.
XX
PN WO200058519-A2.
XX
PD 05-OCT-2000.
XX
PF 30-MAR-2000; 2000WO-US08440.
XX
PR 31-MAR-1999; 99US-0127248.
XX
PA (WHED) WHITEHEAD INST BIOMEDICAL RES.
PA (AFFY-) AFFYMETRIX INC.
XX
PI Altshuler D, Cargill M, Daley GQ, Ireland JS, Lander ES;
PI Lipshutz RJ, Patil N, Sklar P;
XX
DR WPI; 2000-611722/58.
XX
PT Nucleic acid selected from one of 106 genes comprising single
PT nucleotide polymorphisms, allele-specific oligonucleotides to the genes
PT are useful for phenotypic correlations, forensics, paternity testing,
PT medicine and genetic analysis -
XX
PS Claim 1; Fig 5; 214pp; English.
XX
CC The present invention is concerned with a number of human single
CC nucleotide polymorphisms (SNPs) which the inventors identified in human
CC genes. These SNPs can be used in disease diagnosis and prediction of an
CC individual's susceptibility to disease, in forensic and paternity testing
CC and in genetic mapping. In particular, the SNPs of the invention can be
CC used to diagnose susceptibility to diseases of the cardiovascular,
CC endocrine and neurological systems, such as coronary artery disease,
CC schizophrenia, cancer, autoimmune diseases, Alzheimer's and Parkinson's
CC diseases.
CC Note: The degenerate codon within the sequence represents the position
CC of an SNP, for example the letter S represents a polymorphism where the
CC nucleotide may be C or G.
XX
SQ Sequence 318 BP; 66 A; 106 C; 90 G; 55 T; 1 other;

Query Match 99.8%; Score 200.6; DB 21; Length 318;
Best Local Similarity 99.5%; Pred. No. 1.7e-47;
Matches 200; Conservative 1; Mismatches 0; Indels 0; Gaps 0;

```
Qy          1 TCCCCAGACAAGGATGACCAGCTGATCTGTGTGAACGAGAACGGCGGCTGTGAGCAGTAC 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         94 TCCCCAGACAAGGATGACCAGCTGATCTGTGTGAACGAGAACGGCGGCTGTGAGCAGTAC 153

Qy         61 TGCAGTGACCACACGGGCACCAAGCGCTCCTGTCGGTGCCACGAGGGGTACTCTCTGCTG 120
              ||||||||||||||||||||||||||||||||||||||||||||:||||||||||||||||||
Db        154 TGCAGTGACCACACGGGCACCAAGCGCTCCTGTCGGTGCCAYGAGGGGTACTCTCTGCTG 213

Qy        121 GCAGACGGGGTGTCCTGCACACCCACAGGTGACCAGGCTTCATGTCCCAGTCCCAGATGA 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        214 GCAGACGGGGTGTCCTGCACACCCACAGGTGACCAGGCTTCATGTCCCAGTCCCAGATGA 273

Qy        181 CACCAGTCCCTGTCCCACTAG 201
              |||||||||||||||||||||
Db        274 CACCAGTCCCTGTCCCACTAG 294
```

RESULT 1
AAC71295
ID   AAC71295 standard; DNA; 266 BP.
XX
AC   AAC71295;
XX
DT   09-FEB-2001 (first entry)
XX
DE   Single nucleotide polymorphism containing sequence #375.
XX
KW   Single nucleotide polymorphism; SNP; human; genetic disease;
KW   disease susceptibility; cardiovascular system; endocrine system;
KW   neurological system; forensic testing; paternity testing; ds.
XX
OS   Homo sapiens.
XX
PN   WO200058519-A2.
XX
PD   05-OCT-2000.
XX
PF   30-MAR-2000; 2000WO-US08440.
XX
PR   31-MAR-1999;   99US-0127248.
XX
PA   (WHED) WHITEHEAD INST BIOMEDICAL RES.
PA   (AFFY-) AFFYMETRIX INC.
XX
PI   Altshuler D, Cargill M, Daley GQ, Ireland JS, Lander ES;
PI   Lipshutz RJ, Patil N, Sklar P;
XX
DR   WPI; 2000-611722/58.
XX
PT   Nucleic acid selected from one of 106 genes comprising single
PT   nucleotide polymorphisms, allele-specific oligonucleotides to the genes
PT   are useful for phenotypic correlations, forensics, paternity testing,
PT   medicine and genetic analysis -
XX
PS   Claim 1; Fig 5; 214pp; English.
XX
CC   The present invention is concerned with a number of human single
CC   nucleotide polymorphisms (SNPs) which the inventors identified in human
CC   genes. These SNPs can be used in disease diagnosis and prediction of an
CC   individual's susceptibility to disease, in forensic and paternity testing
CC   and in genetic mapping. In particular, the SNPs of the invention can be
CC   used to diagnose susceptibility to diseases of the cardiovascular,
CC   endocrine and neurological systems, such as coronary artery disease,
CC   schizophrenia, cancer, autoimmune diseases, Alzheimer's and Parkinson's
CC   diseases.
CC   Note: The degenerate codon within the sequence represents the position
CC   of an SNP, for example the letter S represents a polymorphism where the
CC   nucleotide may be C or G.
XX
SQ   Sequence 266 BP; 48 A; 84 C; 78 G; 55 T; 1 other;

  Query Match   99.8%; Score 200.6; DB 21; Length 266;
  Best Local Similarity   99.5%; Pred. No. 6.8e-48;

Matches 200; Conservative 1; Mismatches 0; Indels 0; Gaps 0;

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Qy          1 GCAGCACTGCAGAGATTTCATCATGGTCTCCCAGGCCCTCAGGCTCCTCTGCCTTCTGCT 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         59 GCAGCACTGCAGAGATTTCATCATGGTCTCCCAGGCCCTCAGGCTCCTCTGCCTTCTGCT 118

Qy         61 TGGGCTTCAGGGCTGCCTGGCTGCAGGTGCGTCCGGGGAGGTTTTCTCCATAAACTTGGT 120
              ||||||||||||||||||||||||||||||||:|||||||||||||||||||||||||||
Db        119 TGGGCTTCAGGGCTGCCTGGCTGCAGGTGCGTCCRGGGAGGTTTTCTCCATAAACTTGGT 178

Qy        121 GGAAGGGCAGTGGGCAAATCCAGGAGCCAGCCCGGGCTTCCCAAACCCCGCCCTTGCTCC 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        179 GGAAGGGCAGTGGGCAAATCCAGGAGCCAGCCCGGGCTTCCCAAACCCCGCCCTTGCTCC 238

Qy        181 GGACACCCCCATCCACCAGGA 201
              |||||||||||||||||||||
Db        239 GGACACCCCCATCCACCAGGA 259
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